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The Heat emitted from the Human Body as an Element to be regarded in arranging the Ventilation and Warming of Buildings.

QUESTION of primary importance to the architect, and especially to the architect who is entrusted with the designs for any important public building, is that of the heating power of the inmates and occupants of such buildings; that is to say, of the amount of heat which, under ordinary circumstances, escapes from the average individual during any given period of time. It is obvious that no arrangements for either the ventilation or the warming of an important building can be even theoretically perfect in the absence of clear knowledge on this point.

A pound of coal of an average quality will give out, in the process of combustion, rather more than 14,000 British units of heat, each such unit being the amount of heat necessary to raise the temperature of one pound of water 1° Fahrenheit of heat. To effect this combustion, 140 cubic feet of atmospheric air, weighing 11 lb., will be required, and the temperature of this quantity of air, if it were kept free from any disturbing or cooling influences, would be raised as much as 310° Fahr. by the combustion, or say from 62° to 372° Fahr. Of course, it never occurs that the exact quantity of air is thus applied; but a basis of comparison is thus obtained.

The heat liberated by the respiration of an average human being in twenty-four hours will be found to be very nearly equivalent to that which is liberated by the combustion of a pound of coal. 350 cubic feet of atmospheric air are stated by Professor Huxley to be the quantity that passes through the lungs of an ordinary individual in twenty-four hours. This quantity, however, is independent of the unmeasured, though very important, amount of respiration that takes place through the skin. Mr. Bailey Denton calculates that an assemblage of 2,000 persons will, in two hours, give off as much carbon as is contained in a hundred-weight of coals, in addition to 17 gallons of water in the form of vapour. If the quantity of carbon here estimated as consumed in the process of respiration be compared with the prescribed amount of 10 ounces required by the military dietaries (especially when we remember that this combustion goes on more slowly during sleep than in the course of the day), it will be seen that Mr. Denton's estimate does not err on the side of excess. Thus we obtain rather more than 7,000 units of heat as due to the pulmonary consumption of carbon in twenty-four hours, or to the aëration of the arterial blood which takes place in the lungs.

As to the heat which has been produced in the chemical action indicated by the escape of watery vapour in the breath or from the skin, the calculation is more doubtful, owing to the fact that we are not aware of the form in which the elements of this vapour were taken into the animal system. Thus they might have entered as water, or again as elements of those hydrocarbons which we are in the habit of consuming, such as fat or as alcohol. The formation of some thirteen ounces of water from its constituent elements, oxygen and hydrogen, would of course produce an amount of heat greater than that which would be occasioned by the mere passage of an equal quantity of water through the system. In the former case some 5,700 units of heat would be produced. Taking into account the unmeasured degree of heat produced by the dermal respiration, it will thus be seen that the equivalent of a pound of coal is as close to a measure of the heating power of a man, in twenty-four hours, as can be at present pointed out. That is to say, that twenty-four persons in one hour would liberate an amount of heat equal to that which would be produced by the consumption of a pound of coal in that time.

Taking this convenient unit, it becomes possible to calculate with considerable exactitude the allowance that should be made in the construction and ventilation of ball-rooms, assembly-rooms, churches, and other public buildings, for the heating of the air by the natural warmth of the persons whom it is proposed to accommodate. We shall also be able to speak with considerable exactitude as to the difference of temperature that arises in small unventilated bedrooms, and as to the practical cause of that horror of ventilation which we find so general among our cottage population.

We have before seen that the quantity of atmospheric air required for the combustion of a pound of coal is 140 cubic feet, while that which passes through the human lungs in twenty-four hours is more than double that quantity, being 350 cubic feet; the former quantity weighing, in round numbers, 11 lb., the latter 27 lb. The heat liberated we have taken roundly at 14,000 British thermal units. The coefficient of the specific heat of air is given by Mr. D. K. Clark, in his valuable "Manual" (p. 385), as 0·2377. These figures will be found to indicate an elevation of the temperature of 350 cubic feet of air by 88° Fahrenheit as the result of the entire combustion; and if this were regularly carried on for twenty-four hours, and if no heat were lost by radiation, conduction, or any other means, the temperature of that volume of air would steadily rise by 3·66° Fahrenheit per hour. If now we ascertain the degree of dilution which the size and the ventilation of the apartments allow to the expired air, we shall find the bases of our problem to be laid down. But we purposely avoid any attempt at exactitude; and we recommend those of our friends who make use of our units to form their own calculations. The approximate amount of 14,000 British units of heat may, we assume, be safely taken. The specific heat of atmospheric air is a figure easily to be verified. The volume of air through which the heat has to be distributed each investigator may calculate for himself.

We thus find that if we allow a sleeping-apartment of the cubical contents of 1,000 cubic feet for two inmates, and suppose that there is absolutely no ventilation, in eight hours 9,333 British units of heat will have been emitted, and will have gone to raise the temperature of a fraction over 80 lb. of air. It will be seen at once that the resulting heat would be intolerable. Practically such a condition never occurs, because rooms are never really air-tight, and as the internal temperature rises, the escape of the heated air, and its replacement by the external atmosphere, become more and more active. But it will be seen how powerful a calorific agent is at work. And it will readily be understood how the desire for warmth, which is one of the most unfailing instincts of higher animal life, including that of man, naturally overpowers those sanitary conditions which appeal rather to the intelligence than to the feelings.

For the mighty influence of use and of habit must be borne in mind. We may take a case that is directly in point. Suppose a church to hold 500 persons, and that during a given service the doors have been shut, and the ventilation has been left to take care of itself. The effect on the temperature of the church, supposing the service to last an hour and a half, will have been equal to that produced by the combustion of rather more than 30 lb. of coal within the building, no chimney being supposed to carry off any of the heat or carbonic acid gas generated. The actual rise of temperature will depend on the two elements of the cubical contents of the church and the activity of ventilation. The latter, it is true, may be so managed as properly to control both the vitiation and the heating of the air. But we are supposing the ventilation to be imperfect. To the persons within the church the inconvenience occasioned by the deterioration of the air they breathe will be very gradual, and will probably go on increasing for a considerable time before any but those of them who are most delicately organised perceive it. When they quit the building the congregation at once become sensible of a difference in the external air as compared with that they are leaving. But the place must have been overcrowded or under-ventilated to a considerable extent if they become conscious of the fact before quitting their seats. If, on the other hand, we now suppose a fresh congregation to enter, as the first goes out, the degree of heating and of vitiation, which had so gradually been attained as to be almost imperceptible to the persons who caused it, will strike powerfully on the senses of the incomers. This is an experience which is common to almost every one. But it

s not so common for persons to draw from it the true lesson. It is one to be worked out in numbers of attendants, cubic feet of building, degrees of the thermometer, and volume of ventilating movement. As such we commend it to the very careful attention of the architect.

If we now regard the mode in which the air, when thus heated by the caloric liberated from the inmates of a building, tends to find its own thermometrical level, we shall be at once struck with the powerful agency that is at the disposal of the scientific builder.

The pressure at which it is usually calculated that gas for illuminative purposes should issue from the burner is stated to be that of half an inch of water. With this pressure the issue of the jet has a considerable degree of violence, as is more particularly to be noted in the case of fish-tail burners, where the spread of the flame is due to the pressure, and thus to the velocity, at which the gas issues from the orifice of the burner. Now a difference in pressure of more than half an inch of water exists between two atmospheric strata that are 50 ft. apart in vertical distance. If we consult any barometric table constructed for hypsometric purposes (that is to say, for indicating level above the sea by the reading of the barometer), we shall find that a fall of 1 in. of mercury roughly indicates a rise of some 900 ft. in altitude. We say roughly, not from absence of exact figures in the tables, but from the fact that there are two distinct causes of variation, one of which is easy to calculate, while the other is less reducible to rule. At the same spot, as is well known, the reading of the barometer varies from time to time. This variation constitutes the uncertain element. But taking the barometer to be steady, the difference in level indicated by a difference between two simultaneous readings occurs in a ratio dependent on the absolute level of those readings; that is to say, on the height of the stations above the sea. Thus the difference between the readings of 29 in. and 30 in. is tabulated at 883 ft. But that between 29 in. and 28 in. is equal to 914 ft., and the fall from 28 in. to 27 in. of mercury gives a difference in level of 938 ft. Thus we have to regard both the ordinary local reading and the variable daily reading of the barometer with much care when we come to calculations as to levels.

Taking, however, the first tabular indication which we have cited, that of 1 in. of mercury indicating a rise or fall of 883 ft. in level, it will be found more convenient to reduce the vertical measurement to round numbers. On so doing, we find that a difference in level of 100 ft. will give a difference of 0·113 in. in the height of the mercurial column, or a difference of 1·260 in. in the column of a water barometer; so that 50 ft. difference of level may very well be taken, on an average, as equal to half an inch of barometric pressure measured by a column of water,—the relation of the 1·260 in. per 100 ft. varying as we approach the top or the bottom of the vertical distance.

Thus, the architect who intends to make arrangements for the ventilation of a large building,—whether he construct a shaft for that purpose, or whether, as in some of the noble common rooms at Oxford (we can take the dining-room of New College,—if memory serves aright,—for an example), the lower boards of a coved wooden ceiling are pierced, and the heated air, escaping through them, finds its way between the outer roof and the inner ceiling, to a louvred lantern,—has, in the first instance, this power of barometric pressure to aid him. That is to say, that in a building 50 ft. high there will be a less resistance to the issue of a column of air from an aperture at the top than from an equal aperture at the bottom (other things being alike), which is equal to that of a column of half an inch of water. This is only one part of the power at the command of the architect, but it is a very essential one, and one which it is highly important that he should be able accurately to measure.

The other element of power at his command is thermal. Barometric and thermic action may be made either to assist or to counteract one another. Too often the latter is the case. We cannot too much insist on the necessity for a perfect understanding on the part of the architect of the laws of these two causes of movement,—and that not only in general principle, but in numeric exactitude. We are, perhaps, apt to regard the efforts of scientific men to place useful knowledge in the hands of those who require it as dealing too much with what is elementary. But two things are, or may be, intended by that word. Elementary knowledge, to be real knowledge, must be exact. Exactitude is as requisite in the A B C of science as it is in any of the subsequent processes. But to have what is called a general idea,—which may be enough to allow a man to talk on a subject, but which altogether fails to guide him when questions of number, of measure, or of weight have to be decided,—is often spoken of as an elementary acquaintance with a subject. It is, in point of fact, an elementary ignorance.

Fifty feet of elevation, in round numbers, we have seen to give a barometric force equal to that indicated by the pressure of a column of half an inch of water. We now have to inquire what unit of heat may be taken as equivalent to, or as comparable with, this unit of barometric pressure. If more exact numbers are preferred, we have shown what corrections come into play to modify the rough rule of an inch of water pressure per 100 ft. of atmospheric pressure, that is to say, of vertical height.

The volume, density, and pressure of air at various temperatures is tabulated by Mr. D. K. Clark at p. 351 of his "Manual for Mechanical Engineers." The density or weight of 1 cubic foot of atmospheric air, at a temperature of 32, is given at ·080,728, which is the figure of which we have previously made use; but the corresponding barometric pressure is stated at 13·86 pounds per square inch, so that to bring this table into exact acordance with that from which we have previously quoted the relations of height to barometrical pressure, the former must be supposed to be based on observations made at the height of about 2,000 ft. above the level of the sea. We call attention to this fact as illustrating the manner in which the path of a scientific writer is beset by difficulties, and how inaccuracy may arise in the exact citation of the best authorities, if such authorities are independent of one another. A pressure of 30 in. of mercury, which the barometric table assumes to be normal for the sea-level, is that which, according to the thermometric table, is equal to the pressure of a given weight of air having a constant volume at a temperature of 73° Fahrenheit. We shall not occupy our space with a reduction of the two tables to the same terms, but are satisfied with calling the attention of the reader to this slight element of discrepancy.

The rise of temperature from 62° to 70° Fahrenheit, according to Mr. D. K. Clark's table, is equivalent to an increase of pressure per square inch, from 14·70 to 14·92 lb. This is equal to ·0275 lb. per square inch pressure, per degree of Fahrenheit, in increment or decrement. Taking the rough rule that a foot of water is equal to an inch of mercury in barometric balance, and allowing 30 in. of mercury to represent 15 lb. per square inch of pressure (which will be found more useful than any more elaborate formula), we find the increase of a degree in the temperature of the air to be equal to ·055 in. of mercury, or to ·66 in. of water, as barometric pressure. Thus allowing for the escape of heat, we may take the Fahrenheit degree as the approximate equivalent of the half an inch of water, or of the 50 ft. of vertical elevation.

It is evident from these figures (of which we have indicated the authorities with the express intention of inducing our readers to make calculations for themselves) that the thermic power at the disposal of the architect is very much more readily available for the purposes of ventilation than the barometric power. At the same time, the essential importance of the latter is not easy to be overrated. It is an indispensable element to take into account. While impetus is given to the circulating volume by thermic force, the direction of the motion must be impressed on the circulation by barometric force, or by equivalent mechanical means. Here is the key to the structural question of the proper height of chimneys. If artificial means are asked for the production of a current of air, as by a fan, or other mechanical apparatus, the emission may be so far under the control of the architect that he may lead his flues where he will. But if he relies on the two natural motors of thermic and barometric pressure, woe will betide him if he neglects to give due attention to the latter. He may thus not only neutralise the action of the thermic force, but even set it to work in the wrong direction. It is the neglect of these primary principles which is the efficient cause of smoky chimneys.

Another element has to be regarded which may affect the movement of the ventilating circulation, especially when the barometric conditions are neglected. That is, the pressure of the wind on the apertures by which the vitiated air escapes. In this, as in the case of the thermic force, what is, properly regarded, a power at the disposal of the ventilator, is often allowed to act as an impediment instead of an aid. Thus, if a vertical shaft be constructed with an open and unprotected top, the effect of a strong current of wind is to keep back the escape of air from that tube; and so readily is this perceptible, that, in an ill-constructed chimney, blasts of wind without are often accompanied with puffs of smoke within the dwelling.

The pressure of the wind, according to Smeaton's experiments, rises from ·005 lb. per square foot, with the hardly perceptible motion of a mile per hour, to 31·490 lb. per square foot in a hurricane of eighty miles per hour. Other observers have estimated the force of a hurricane of 100 miles per hour, which Smeaton took at 49·2 lb. per square foot, and later authorities as high as 62 lb. per square foot. A pressure of 55 lb. per square foot has been actually registered at the Glasgow observatory. Professor Airy has stated that a pressure of 80 lb. per square foot may be obtained. The great storm of 1703 was estimated as travelling at the rate of forty-five miles per hour; and the resultant pressure was calculated by Smeaton at 9·963 lb., and by later authorities as 10·1 lb. per square foot of the surface exposed to its fury. This is equal to ·07 lb. per square inch, or to 0·14 inch of mercury, or 1·68 inch of water in the barometric column.

Thus the effect of a storm of unusual violence, supposing it to be directly exerted in preventing the escape of a ventilating column of air, would be about equal to the barometric value of a chimney of 170 ft. in height. This, however, is dealing with one element alone. We are supposing the movement to be so sluggish that the thermic force can be neglected. But it is that force which it is, usually speaking, most readily in the power of the ventilator to regulate. To a good volumetric discharge, driven by an elevated temperature, and directed by a lofty chimney, the proportionate check offered by even the fiercest hurricane is comparatively small. For it has to be measured, not only by the barometric height, but by the actual velocity of the column of escaping air. And as that velocity may be increased, almost *ad libitum*, by the application of artificial heat, it is clear that the architect has little to fear from the wind as an enemy to ventilation, if he knows what he is about. We may take another opportunity to show how he may make a violent wind, instead of an obstruction, an assistant, to ventilation.

It follows from the laws which we have attempted in some degree to elucidate, that in the hands of the wise master-builder those causes which frequently impede ventilation, or, at all events, lead to great inconvenience, may be converted into the very motor powers of a well-regulated ventilating current. This, of course, will by no means be new to many of our readers, more especially to those of them who are at home in the well-digested system of mine ventilation on which the yield of our coal fields so closely depends. The point which we venture to think novel, is the inquiry into the radiant heat produced by the process of animal respiration, as affording, in point of fact, an element of ventilating power. The estimate of that heating power which we have offered is, of course, approximate only. It is, however, founded on the best scientific data as yet attainable. And it is enough to afford an interesting means of comparison in the case of thermometric observations on buildings containing many persons, especially when they are ill-ventilated. In these, and in the opposite cases, much information may be collected by noting, in addition to the elements of cubic contents, number of persons, and flow of ventilating column, the actual temperature of the entering and of the issuing air. In an arrangement made for the purpose of this investigation, the architect would find a very valuable field of study. Meantime, the rough rule that from twenty-four persons assembled in a building there is liberated in an hour an amount of heat equal to that produced by the combustion of a pound of coal, is one that may afford food for very profitable meditation.

THE ARCHÆOLOGICAL TREASURES OF FRANCE.

WITH the yearly return of the season when the provincial archæological societies meet in each corner of Great Britain, many interesting reports of the labours of which have been registered in these pages, what artistic or archæological student can have failed, on reading the series of discoveries which each year's meetings bring to light, to regret the want of system and order which allow these, and similar reports elsewhere, to be buried in the bulky, even if accessible, tomes of the *Times* or the *Builder*, or scattered through the various local journals of the United Kingdom?

In vain the methodical student,—fervent member, perhaps, of the Index Society,—may either destroy his weekly numbers as they appear, or purchase double copies of his journal, and strictly classify his archæological gatherings, the task is too huge for unaided completion, as each year the bulk of matter increases.

From France, where the study of local archæology receives no less attention than with us, a suggestion reaches us that may not be unworthy the consideration of our numerous readers interested in the rich archæology of our country. It is a suggestion which we would heartily wish taken up in England, in order to systematise the at present entirely unconnected labours of numerous societies, and which could not fail to draw a more suitable share of attention to their too little appreciated labours.

Not long since, we had occasion to refer to the successful results obtained by the Commission nominated for the purpose of forming an "Inventory of the artistic treasures of France." Nearly thirty years ago, at the time of our first Great Exhibition of 1851, the project of forming this inventory of the artistic treasures of France, existing in the museums, churches, and other public monuments, was proposed at a congress of learned societies; a catalogue, in which the treasures were to be classified and summarily described, in order to facilitate future research. But the amount of energy and labour which such an immense task required was only too apparent to those even most interested in the success of the project, and to this fact must be attributed the failure of the first proposal. Five years ago, M. de Chennevières presented to the Minister of Fine Arts a renewal of the project, which this time met with immediate attention and encouragement.

A commission was formed, among the members of which were the curators of the Louvre and several other important national museums, the librarians of the Bibliothèque Nationale, the City of Paris and several literary and art-critics. On its first meeting, the Commission determined on the rules to be followed in the formation of their inventory; it was immediately settled that a mere mention of each article in the inventory was not sufficient, but a concise description, in which the origin, history, and any other information connected with the object should, after due examination, be carefully set forth. For the present, it has been determined that the inventory shall be strictly limited to national property. Such, however, was not the original project; it had been intended to insert, with the permission of the owner, objects of art preserved, even in private hands. But the proposal has been rejected, M. Darcel last year, at a congress of provincial learned societies, having explained the difficulty of cataloguing objects in the possession of private individuals. "They are objects which may change hands, and even disappear without a trace left but a regret." Should the proposal, however, meet with approbation from private collectors, there exists little reason why such an addition should not yet be made to the work of the Commission; and what an interesting addition such a catalogue could not fail to be, is constantly being proved in the valuable collections which, more in England than in France, are yearly bequeathed to the nation: such collections as that lately left by Mr. Henderson, in whose hands, as in those of many another *dilettante*, existed hidden treasures of an interest unknown except to a few acquaintances. In future volumes, those devoted to the contents of the private collections we might predict with ease would be the most valuable for reference; successive supplements following the change of ownership of each of the catalogued objects.

It was further determined that to the capital a special inventory should be devoted. As the inventory of each museum or church is published it is indexed, and in this manner at any future date the order may be easily re-arranged; the MS. "copy" is examined, and the proofs corrected by those members of the Commission who may choose to take upon themselves this duty; although all responsibility rests with the Commission, each portion is signed by its respective author. Such being the first determination of the Commission, a circular was addressed severally to the curators of all provincial museums and public collections, to all the presidents of the learned societies, to the keepers of the records, the prefects and mayors of each town and city in the country. The curators of the museums were requested to send, in addition to their printed catalogues, any written notes or private remarks in connexion with the establishment under their charge. These catalogues on their receipt, it may be observed, are examined and classified, after which the inspectors of the commission put themselves in communication with the curator, whose personal opinions and observations are additionally made use of.

The plan thus put into working order, it was with no small degree of reason that M. de Chennevières urged the necessity and importance of the work being actively carried out,—"The treasures of the provinces are not sufficiently appreciated, as they are not sufficiently known. The inventory which we project, as it is prepared, will be published and placed within the power of all to purchase and refer to. In visiting any town, the student will be sure to find, by previous consultation of such an inventory, objects worthy his notice. In this manner public attention will be more generally drawn to local and little-known collections of inestimable value."

From the keeper of the records is asked a copy (where possible) of all documents concerning the origin, the cost, donors, and successive transmission of all artistic objects at present in possession of the Government; the mayors of all towns are additionally requested to aid as far as lies within their power the work of the Commission.

As a further addition to these documents, a memorandum distributed at the time, contained the instructions relating to the formation of the inventory and notes to be sent to the Commission, a very necessary measure to ensure uniformity in the classification. For the cataloguing of pictures, a description of subject, size, history, method of possession, and classification according to school, or the material in which produced; for sculpture, whether antique, middle age, Renaissance, or modern; enamels, gems, gold and silver work, glass, bronze, ivory, furniture, stuff, embroidery, tapestry, and so forth,—all follow the same rule in being catalogued, as also descriptions of artistic merit, or treating of artistic personages. In the inventory of the contents of cathedrals and churches, a plan of a typical cathedral, with each of its features plainly marked, and a table explaining the order to be followed in describing the situation of each object, ensures exact uniformity in description. In this latter instance, too great praise cannot be awarded to the Commission for their thoughtfulness, when we consider how sadly guide-books serve to puzzle the student in his search for any object according to the directions of his printed *cicerone*.

In June, 1877, under the presidency of Marshal MacMahon, the Commission was definitely organised; and, in July of that year, M. de Chennevières was able to terminate his report, with a statement of the progress of the Commission. "From all sides we receive help and support; relations have been established with all the provinces; and we are now certain that nothing can arrest the rapid and regular progress of a publication of which the whole of France is the *collaborateur*."

It is now four years since the work was undertaken. It has already produced four volumes, two of which are devoted to the religious monuments of Paris; comprising the inventory of not a few of its famous churches, among which are Saint-Germain l'Auxerrois, Saint-Germain des Prés, Saint Severin, and Notre Dame. The two other volumes contain the monography of several provincial museums, the most important of which is that of Orleans. Each inventory commences with a slight historical sketch of the church or museum about to be described, and to each is attached an index.*

The Commission has recently undergone some important modifications, which, it is hoped, will increase the value of its labours. The new elements which have been lately introduced may serve to correct many existing defects; on many points the original rules can scarcely be modified or improved, though much will probably be done to increase the value of the inventory as a work of reference.

Foremost among these we would venture to suggest the addition of an index, by means of which the student might be able to refer to specimens of any special art; the metal-worker, for example, be enabled, by reference to the index, to be directed to specimens of that work of different periods and countries; the same with the goldsmith, the modeller, the carver, or the jeweller, among other art-workers and designers.

Could such a catalogue or inventory be formed in England, what a host of treasures should we find we possessed, the knowledge of the existence of which is at present confined to a few? What a noble work of study for the art-worker, the archæologist, and the literary student would such volumes become? What an encyclopædia for constant reference? What a field for subsequent illustration, when in course of time a complete inventory had been formed?

What Belgium some time since so successfully carried out,—what France is at present rapidly forming,—England should possess, and when Europe is thus inventoried, what more valuable handbook will the traveller need to refer to before starting on his journey than the note-book in which he will have jotted down "the things of note," that the tour he may thus map out will enable him to inspect, in church, in castle, in abbey, cathedral, or museum?

* At the commencement of each volume are to be found the reports, from the perusal of which we owe much of the information contained in this article. For those who may wish to purchase the volumes we may observe that there are three editions, one on ordinary paper, the volume costing 9 francs, one on vellum paper (15 francs), and one on Dutch (30 francs). Two volumes appear annually. Each of the *fascicules* costs respectively 3, 5, and 10 francs. The publishers are Messrs. E. Plon et Cie., Rue Garancière, No. 10; Paris.

SCOTT AND WORDSWORTH ON HIGHLAND SCENERY.

No thoughtful visitor to any of the current exhibitions can fail to be struck with the hold which landscapes now have over the public taste, nor to recognise how large a part of modern art is occupied by the portrayal of scenery. And if something more than a mere passing thought is given to this fact, it can hardly be doubted that the mind of the public was in this respect greatly influenced by the writings of Scott and Wordsworth. If we may assume this to be true, it becomes of considerable interest to note the method of treatment which these two great poets adopted in their depiction of landscape beauty, and especially of mountain beauty. That the assumption we have made is not without foundation may be seen in a remark which Lockhart makes in his life of Scott; for he relates how, after the publication of the "Lady of the Lake," "crowds set off to view the scenery of Loch Katrine, till then comparatively unknown." And the hundreds of tourists who still gaze with interest upon Ellen's Isle and the "silver strand" prove that the impetus given by Scott at first to the visiting of the Highlands in no way diminishes as time goes on, and that his most enduring monuments are the crags of Ben Venue and the waters of Loch Katrine. Indeed, Scott is quite, in popular consideration, the poet of the Highlands; and, for poetical descriptions of mountain scenery, most men turn to his pages. So that for one reader of Wordsworth for this purpose there are ten of Scott; though, if these two great poets are compared in their general poetic treatment of Highland scenery, it becomes more and more clear that the true poet of the Highlands is Wordsworth, so far as the description, and the real appreciation of mountain and loch, are concerned. In saying this, it is by no means necessary to depreciate the many merits of Scott as a vigorous and imaginative teller of a poetic romance; indeed, the spirited story-teller must necessarily, in order to be such, want the characteristics which are essential for the writer of meditative or purely thoughtful verse. To linger over the beauty of each tuft of heather and each drooping birch would at once stop the rapid run of the events of the romance.

The cardinal point of difference, however, between the treatment of Highland scenery by Scott and Wordsworth lies chiefly in this, that the former regards it entirely as secondary to the plot of the narrative, and looks upon it

is not so common for persons to draw from it the true lesson. It is one to be worked out in numbers of attendants, cubic feet of building, degrees of the thermometer, and volume of ventilating movement. As such we commend it to the very careful attention of the architect.

If we now regard the mode in which the air, when thus heated by the caloric liberated from the inmates of a building, tends to find its own thermometrical level, we shall be at once struck with the powerful agency that is at the disposal of the scientific builder.

The pressure at which it is usually calculated that gas for illuminative purposes should issue from the burner is stated to be that of half an inch of water. With this pressure the issue of the jet has a considerable degree of violence, as is more particularly to be noted in the case of fish-tail burners, where the spread of the flame is due to the pressure, and thus to the velocity, at which the gas issues from the orifice of the burner. Now a difference in pressure of more than half an inch of water exists between two atmospheric strata that are 50 ft. apart in vertical distance. If we consult any barometric table constructed for hypsometric purposes (that is to say, for indicating level above the sea by the reading of the barometer), we shall find that a fall of 1 in. of mercury roughly indicates a rise of some 900 ft. in altitude. We say roughly, not from absence of exact figures in the tables, but from the fact that there are two distinct causes of variation, one of which is easy to calculate, while the other is less reducible to rule. At the same spot, as is well known, the reading of the barometer varies from time to time. This variation constitutes the uncertain element. But taking the barometer to be steady, the difference in level indicated by a difference between two simultaneous readings occurs in a ratio dependent on the absolute level of those readings; that is to say, on the height of the stations above the sea. Thus the difference between the readings of 29 in. and 30 in. is tabulated at 883 ft. But that between 29 in. and 28 in. is equal to 914 ft., and the fall from 28 in. to 27 in. of mercury gives a difference in level of 938 ft. Thus we have to regard both the ordinary local reading and the variable daily reading of the barometer with much care when we come to calculations as to levels.

Taking, however, the first tabular indication which we have cited, that of 1 in. of mercury indicating a rise or fall of 883 ft. in level, it will be found more convenient to reduce the vertical measurement to round numbers. On so doing, we find that a difference in level of 100 ft. will give a difference of 0·113 in. in the height of the mercurial column, or a difference of 1·260 in. in the column of a water barometer; so that 50 ft. difference of level may very well be taken, on an average, as equal to half an inch of barometric pressure measured by a column of water,—the relation of the 1·260 in. per 100 ft. varying as we approach the top or the bottom of the vertical distance.

Thus, the architect who intends to make arrangements for the ventilation of a large building,—whether he construct a shaft for that purpose, or whether, as in some of the noble common rooms at Oxford (we can take the dining-room of New College,—if memory serves aright,—for an example), the lower boards of a coved wooden ceiling are pierced, and the heated air, escaping through them, finds its way between the outer roof and the inner ceiling, to a louvred lantern,—has, in the first instance, this power of barometric pressure to aid him. That is to say, that in a building 50 ft. high there will be a less resistance to the issue of a column of air from an aperture at the top than from an equal aperture at the bottom (other things being alike), which is equal to that of a column of half an inch of water. This is only one part of the power at the command of the architect, but it is a very essential one, and one which it is highly important that he should be able accurately to measure.

The other element of power at his command is thermal. Barometric and thermic action may be made either to assist or to counteract one another. Too often the latter is the case. We cannot too much insist on the necessity for a perfect understanding on the part of the architect of the laws of these two causes of movement,—and that not only in general principle, but in numeric exactitude. We are, perhaps, apt to regard the efforts of scientific men to place useful knowledge in the hands of those who require it as dealing too much with what is elementary. But two things are, or may be, intended by that word. Elementary knowledge, to be real knowledge, must be exact. Exactitude is as requisite in the A B C of science as it is in any of the subsequent processes. But to have what is called a general idea,—which may be enough to allow a man to talk on a subject, but which altogether fails to guide him when questions of number, of measure, or of weight have to be decided,—is often spoken of as an elementary acquaintance with a subject. It is, in point of fact, an elementary ignorance.

Fifty feet of elevation, in round numbers, we have seen to give a barometric force equal to that indicated by the pressure of a column of half an inch of water. We now have to inquire what unit of heat may be taken as equivalent to, or as comparable with, this unit of barometric pressure. If more exact numbers are preferred, we have shown what corrections come into play to modify the rough rule of an inch of water pressure per 100 ft. of atmospheric pressure, that is to say, of vertical height.

The volume, density, and pressure of air at various temperatures is tabulated by Mr. D. K. Clark at p. 351 of his "Manual for Mechanical Engineers." The density or weight of 1 cubic foot of atmospheric air, at a temperature of 32, is given at ·080,728, which is the figure of which we have previously made use; but the corresponding barometric pressure is stated at 13·86 pounds per square inch, so that to bring this table into exact acordance with that from which we have previously quoted the relations of height to barometrical pressure, the former must be supposed to be based on observations made at the height of about 2,000 ft. above the level of the sea. We call attention to this fact as illustrating the manner in which the path of a scientific writer is beset by difficulties, and how inaccuracy may arise in the exact citation of the best authorities, if such authorities are independent of one another. A pressure of 30 in. of mercury, which the barometric table assumes to be normal for the sea-level, is that which, according to the thermometric table, is equal to the pressure of a given weight of air having a constant volume at a temperature of 73° Fahrenheit. We shall not occupy our space with a reduction of the two tables to the same terms, but are satisfied with calling the attention of the reader to this slight element of discrepancy.

The rise of temperature from 62° to 70° Fahrenheit, according to Mr. D. K. Clark's table, is equivalent to an increase of pressure per square inch, from 14·70 to 14·92 lb. This is equal to ·0275 lb. per square inch pressure, per degree of Fahrenheit, in increment or decrement. Taking the rough rule that a foot of water is equal to an inch of mercury in barometric balance, and allowing 30 in. of mercury to represent 15 lb. per square inch of pressure (which will be found more useful than any more elaborate formula), we find the increase of a degree in the temperature of the air to be equal to ·055 in. of mercury, or to ·66 in. of water, as barometric pressure. Thus allowing for the escape of heat, we may take the Fahrenheit degree as the approximate equivalent of the half an inch of water, or of the 50 ft. of vertical elevation.

It is evident from these figures (of which we have indicated the authorities with the express intention of inducing our readers to make calculations for themselves) that the thermic power at the disposal of the architect is very much more readily available for the purposes of ventilation than the barometric power. At the same time, the essential importance of the latter is not easy to be overrated. It is an indispensable element to take into account. While impetus is given to the circulating volume by thermic force, the direction of the motion must be impressed on the circulation by barometric force, or by equivalent mechanical means. Here is the key to the structural question of the proper height of chimneys. If artificial means are asked for the production of a current of air, as by a fan, or other mechanical apparatus, the emission may be so far under the control of the architect that he may lead his flues where he will. But if he relies on the two natural motors of thermic and barometric pressure, woe will betide him if he neglects to give due attention to the latter. He may thus not only neutralise the action of the thermic force, but even set it to work in the wrong direction. It is the neglect of these primary principles which is the efficient cause of smoky chimneys.

Another element has to be regarded which may affect the movement of the ventilating circulation, especially when the barometric conditions are neglected. That is, the pressure of the wind on the apertures by which the vitiated air escapes. In this, as in the case of the thermic force, what is, properly regarded, a power at the disposal of the ventilator, is often allowed to act as an impediment instead of an aid. Thus, if a vertical shaft be constructed with an open and unprotected top, the effect of a strong current of wind is to keep back the escape of air from that tube; and so readily is this perceptible, that, in an ill-constructed chimney, blasts of wind without are often accompanied with puffs of smoke within the dwelling.

The pressure of the wind, according to Smeaton's experiments, rises from ·005 lb. per square foot, with the hardly perceptible motion of a mile per hour, to 31·490 lb. per square foot in a hurricane of eighty miles per hour. Other observers have estimated the force of a hurricane of 100 miles per hour, which Smeaton took at 49·2 lb. per square foot, and later authorities as high as 62 lb. per square foot. A pressure of 55 lb. per square foot has been actually registered at the Glasgow observatory. Professor Airy has stated that a pressure of 80 lb. per square foot may be obtained. The great storm of 1705 was estimated as travelling at the rate of forty-five miles per hour; and the resultant pressure was calculated by Smeaton at 9·963 lb., and by later authorities as 10·1 lb. per square foot of the surface exposed to its fury. This is equal to ·07 lb. per square inch, or to 0·14 inch of mercury, or 1·68 inch of water in the barometric column.

Thus the effect of a storm of unusual violence, supposing it to be directly exerted in preventing the escape of a ventilating column of air, would be about equal to the barometric value of a chimney of 170 ft. in height. This, however, is dealing with one element alone. We are supposing the movement to be so sluggish that the thermic force can be neglected. But it is that force which it is, usually speaking, most readily in the power of the ventilator to regulate. To a good volumetric discharge, driven by an elevated temperature, and directed by a lofty chimney, the proportionate check offered by even the fiercest hurricane is comparatively small. For it has to be measured, not only by the barometric height, but by the actual velocity of the column of escaping air. And as that velocity may be increased, almost *ad libitum*, by the application of artificial heat, it is clear that the architect has little to fear from the wind as an enemy to ventilation, if he knows what he is about. We may take another opportunity to show how he may make a violent wind, instead of an obstruction, an assistant, to ventilation.

It follows from the laws which we have attempted in some degree to elucidate, that in the hands of the wise master-builder those causes which frequently impede ventilation, or, at all events, lead to great inconvenience, may be converted into the very motor powers of a well-regulated ventilating current. This, of course, will by no means be new to many of our readers, more especially to those of them who are at home in the well-digested system of mine ventilation on which the yield of our coal fields so closely depends. The point which we venture to think novel, is the inquiry into the radiant heat produced by the process of animal respiration, as affording, in point of fact, an element of ventilating power. The estimate of that heating power which we have offered is, of course, approximate only. It is, however, founded on the best scientific data as yet attainable. And it is enough to afford an interesting means of comparison in the case of thermometric observations on buildings containing many persons, especially when they are ill-ventilated. In these, and in the opposite cases, much information may be collected by noting, in addition to the elements of cubic contents, number of persons, and flow of ventilating column, the actual temperature of the entering and of the issuing air. In an arrangement made for the purpose of this investigation, the architect would find a very valuable field of study. Meantime, the rough rule that from twenty-four persons assembled in a building there is liberated in an hour an amount of heat equal to that produced by the combustion of a pound of coal, is one that may afford food for very profitable meditation.

THE ARCHÆOLOGICAL TREASURES OF FRANCE.

WITH the yearly return of the season when the provincial archæological societies meet in each corner of Great Britain, many interesting reports of the labours of which have been registered in these pages, what artistic or archæological student can have failed, on reading the series of discoveries which each year's meetings bring to light, to regret the want of system and order which allow these, and similar reports elsewhere, to be buried in the bulky, even if accessible, tomes of the *Times* or the *Builder*, or scattered through the various local journals of the United Kingdom?

In vain the methodical student,—fervent member, perhaps, of the Index Society,—may either destroy his weekly numbers as they appear, or purchase double copies of his journal, and strictly classify his archæological gatherings, the task is too huge for unaided completion, as each year the bulk of matter increases.

From France, where the study of local archæology receives no less attention than with us, a suggestion reaches us that may not be unworthy the consideration of our numerous readers interested in the rich archæology of our country. It is a suggestion which we would heartily wish taken up in England, in order to systematise the at present entirely unconnected labours of numerous societies, and which could not fail to draw a more suitable share of attention to their too little appreciated labours.

Not long since, we had occasion to refer to the successful results obtained by the Commission nominated for the purpose of forming an "Inventory of the artistic treasures of France." Nearly thirty years ago, at the time of our first Great Exhibition of 1851, the project of forming this inventory of the artistic treasures of France, existing in the museums, churches, and other public monuments, was proposed at a congress of learned societies; a catalogue, in which the treasures were to be classified and summarily described, in order to facilitate future research. But the amount of energy and labour which such an immense task required was only too apparent to those even most interested in the success of the project, and to this fact must be attributed the failure of the first proposal. Five years ago, M. de Chennevières presented to the Minister of Fine Arts a renewal of the project, which this time met with immediate attention and encouragement.

A commission was formed, among the members of which were the curators of the Louvre and several other important national museums, the librarians of the Bibliothèque Nationale, the City of Paris and several literary and art-critics. On its first meeting, the Commission determined on the rules to be followed in the formation of their inventory; it was immediately settled that a mere mention of each article in the inventory was not sufficient, but a concise description, in which the origin, history, and any other information connected with the object should, after due examination, be carefully set forth. For the present, it has been determined that the inventory shall be strictly limited to national property. Such, however, was not the original project; it had been intended to insert, with the permission of the owner, objects of art preserved, even in private hands. But the proposal has been rejected, M. Darcel last year, at a congress of provincial learned societies, having explained the difficulty of cataloguing objects in the possession of private individuals. "They are objects which may change hands, and even disappear without a trace left but a regret." Should the proposal, however, meet with approbation from private collectors, there exists little reason why such an addition should not yet be made to the work of the Commission; and what an interesting addition such a catalogue could not fail to be, is constantly being proved in the valuable collections which, more in England than in France, are yearly bequeathed to the nation: such collections as that lately left by Mr. Henderson, in whose hands, as in those of many another *dilettante*, existed hidden treasures of an interest unknown except to a few acquaintances. In future volumes, those devoted to the contents of the private collections we might predict with ease would be the most valuable for reference; successive supplements following the change of ownership of each of the catalogued objects.

It was further determined that to the capital a special inventory should be devoted. As the inventory of each museum or church is published it is indexed, and in this manner at any future date the order may be easily re-arranged; the MS. "copy" is examined, and the proofs corrected by those members of the Commission who may choose to take upon themselves this duty; although all responsibility rests with the Commission, each portion is signed by its respective author. Such being the first determination of the Commission, a circular was addressed severally to the curators of all provincial museums and public collections, to all the presidents of the learned societies, to the keepers of the records, the prefects and mayors of each town and city in the country. The curators of the museums were requested to send, in addition to their printed catalogues, any written notes or private remarks in connexion with the establishment under their charge. These catalogues on their receipt, it may be observed, are examined and classified, after which the inspectors of the commission put themselves in communication with the curator, whose personal opinions and observations are additionally made use of.

The plan thus put into working order, it was with no small degree of reason that M. de Chennevières urged the necessity and importance of the work being actively carried out,—"The treasures of the provinces are not sufficiently appreciated, as they are not sufficiently known. The inventory which we project, as it is prepared, will be published and placed within the power of all to purchase and refer to. In visiting any town, the student will be sure to find, by previous consultation of such an inventory, objects worthy his notice. In this manner public attention will be more generally drawn to local and little-known collections of inestimable value."

From the keeper of the records is asked a copy (where possible) of all documents concerning the origin, the cost, donors, and successive transmission of all artistic objects at present in possession of the Government; the mayors of all towns are additionally requested to aid as far as lies within their power the work of the Commission.

As a further addition to these documents, a memorandum distributed at the time, contained the instructions relating to the formation of the inventory and notes to be sent to the Commission, a very necessary measure to ensure uniformity in the classification. For the cataloguing of pictures, a description of subject, size, history, method of possession, and classification according to school, or the material in which produced; for sculpture, whether antique, middle age, Renaissance, or modern; enamels, gems, gold and silver work, glass, bronze, ivory, furniture, stuff, embroidery, tapestry, and so forth,—all follow the same rule in being catalogued, as also descriptions of artistic merit, or treating of artistic personages. In the inventory of the contents of cathedrals and churches, a plan of a typical cathedral, with each of its features plainly marked, and a table explaining the order to be followed in describing the situation of each object, ensures exact uniformity in description. In this latter instance, too great praise cannot be awarded to the Commission for their thoughtfulness, when we consider how sadly guide-books serve to puzzle the student in his search for any object according to the directions of his printed *cicerone*.

In June, 1877, under the presidency of Marshal MacMahon, the Commission was definitely organised; and, in July of that year, M. de Chennevières was able to terminate his report, with a statement of the progress of the Commission. "From all sides we receive help and support; relations have been established with all the provinces; and we are now certain that nothing can arrest the rapid and regular progress of a publication of which the whole of France is the *collaborateur*."

It is now four years since the work was undertaken. It has already produced four volumes, two of which are devoted to the religious monuments of Paris; comprising the inventory of not a few of its famous churches, among which are Saint-Germain l'Auxerrois, Saint-Germain des Prés, Saint Severin, and Notre Dame. The two other volumes contain the monography of several provincial museums, the most important of which is that of Orleans. Each inventory commences with a slight historical sketch of the church or museum about to be described, and to each is attached an index.*

The Commission has recently undergone some important modifications, which, it is hoped, will increase the value of its labours. The new elements which have been lately introduced may serve to correct many existing defects; on many points the original rules can scarcely be modified or improved, though much will probably be done to increase the value of the inventory as a work of reference.

Foremost among these we would venture to suggest the addition of an index, by means of which the student might be able to refer to specimens of any special art; the metal-worker, for example, be enabled, by reference to the index, to be directed to specimens of that work of different periods and countries; the same with the goldsmith, the modeller, the carver, or the jeweller, among other art-workers and designers.

Could such a catalogue or inventory be formed in England, what a host of treasures should we find we possessed, the knowledge of the existence of which is at present confined to a few? What a noble work of study for the art-worker, the archæologist, and the literary student would such volumes become? What an encyclopædia for constant reference? What a field for subsequent illustration, when in course of time a complete inventory had been formed?

What Belgium some time since so successfully carried out,—what France is at present rapidly forming,—England should possess, and when Europe is thus inventoried, what more valuable handbook will the traveller need to refer to before starting on his journey than the note-book in which he will have jotted down "the things of note," that the tour he may thus map out will enable him to inspect, in church, in castle, in abbey, cathedral, or museum?

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The cardinal point of difference, however, between the treatment of Highland scenery by Scott and Wordsworth lies chiefly in this, that the former regards it entirely as secondary to the plot of the narrative, and looks upon it

merely as an embellishment for the main events of his tale. Whereas Wordsworth makes the landscape for the time being the main object of his poetry, and considers it, if not superior at any rate as equal to the human beings whom he brings before the reader,—

"Happy is he who lives to understand
Not human nature only, but explores
All natures . . . . . .
Up from the creeping plant to sovereign man."

These lines from the "Excursion" thus form the key in some respect to the difference which exists in the treatment of mountain scenery by the English and Scottish poet. But there are other distinct characteristics of these two mountain poets in this particular besides the fact that the one makes the description of scenery of primary and the other of secondary importance. Scott paints with a broad and vigorous touch, with a constant use of striking but ill-chosen metaphors and illustrations. He rarely descends into details, but having portrayed the outlines, he leaves the rest to the imagination of the reader. He shows himself the passing observer rather than the student and the lover of mountain scenery. Yet the consequence of this general sketchiness of description is, on the whole, one of the secrets of Scott's successes. The thoughtful observer of each particular trait of the landscape beauties of Loch Katrine fills in the details for himself, and the mere passer by, when he reads "The Lady of the Lake," is carried away by the vigour of the verse and the general boldness of the outlines, so that he does not stay to inquire into their truth. But Wordsworth, on the other hand, can be at once broad and accurate in his treatment of landscape, though the chief characteristic of his work must be considered in its completeness of detail, whether directly or by suggestion. At times he descends into the minutest details and ponders over the rippling burn, the red berries of the rowan tree, and the purple ling, with a perfectly loving care and completeness. He looks for suggestions, and he seeks for the inspiration of the mountain and the lake. This mosaic-like minuteness in some degree has repelled popular readers from Wordsworth's descriptions, or has been hastily passed over, whilst it has, though opening out nature's beauties more completely to careful students, produced literary imitations which under the guise of poetry are little better than prose, such as Clough's description in the Bothie of Tober-na-Vuorlich of the river, and its basin "10 ft. wide and 18 ft. long." But such minute description, whilst it certainly has done and is doing much to cause mountain scenery to be studied thoroughly and completely, and to show that each part of the large mountain, and the spreading lake, are worthy of equal observation with the general mass of the hills, and the general tints of the landscape, is certain, from time to time, to cause the descriptions to become both commonplace and utterly puerile. For it is easier to keep up to a comparatively high level in general description of scenery than it is when the details of the landscape are the subject of the poem. The distinction here drawn between the characteristics of Scott's and Wordsworth's treatment of Highland scenery is still further borne out by Scott's own poor opinion of his own power of landscape description, strange as it may seem to his ardent admirers. "To me," he writes in his autobiographical fragment, "the wandering over the field of Bannockburn was the source of more exquisite pleasure than gazing upon the celebrated landscape from the battlements of Stirling Castle. . . . . If I have since been able in poetry to trace with some success the principles of the latter (the picturesque in landscape as distinguished from the picturesque in action), it has always been with reference to its general and leading features, or under some alliance with moral feeling; and even this proficiency has cost me study." It is not difficult to find upon opening the "Lady of the Lake" examples of Scott's manner of describing by general features only, and of his use of ill-chosen metaphors, which placed side by side with any piece of Wordsworth's descriptions of Highland scenery bring out very strikingly the wide difference in this respect between these two poets. Thus:—

"The western waves of ebbing day
Roll'd o'er the glen their level way,
Each purple peak, each flinty spire
Was bathed in floods of living fire,
But not a setting beam could glow
Within the dark ravines below,
Where twined the path in shadow hid
Round many a rocky pyramid."

Here all the epithets are distinctly general, and the whole ends with an illustration completely inapplicable to Highland scenery. A pyramid gives the idea of mathematical regularity and precision, whereas irregularity and broken heights are the characteristics of the mountains beneath which Loch Katrine lies. Again, later on, this lake beneath the rays of the setting sun is described as being

"One burnish'd sheet of living gold."

A man might live for a century on Loch Katrine's banks without seeing it look like a sheet of living gold, even if one knew what the writer meant by the words "living" gold; and these are but two examples from many which are at hand. Some of our readers may remember how Dorothy Wordsworth has described in her own simple way how she and her brother, when travelling in the Highlands in 1803, noticed the fair Highland maid at the Falls of Inversnaid, which caused Wordsworth to write one of his best known poems, that "To a Highland Girl." These are the features of the landscape among which the maiden stands:—

"And these gray rocks; this household lawn;
These trees a vail just half withdrawn;
This fall of water that doth make
A murmur near the silent lake;
This little bay, a quiet road
That holds in shelter thy abode;
In truth together do ye seem
Like something fashion'd in a dream."

This is quite in Wordsworth's best manner. There is great pointedness without undue detail. The antithesis of the epithets brings out their complete application to the subject of the poem, and, without being too minute, both the epithets and the several lines bring before the mind a perfectly real picture of one of those miniature landscapes where the burn loses itself in the loch which are so unique and so beautiful a feature of Highland scenery. There is also in these, as in nearly all Wordsworth's descriptive lines, what can only be described as a feeling for the landscape which is utterly wanting in Scott, and which is a distinct point of difference. It is a quality which can hardly be accurately defined, but it is one which shows a kind of reflection in the mind of the poet of the features of the landscape, and which shows also a certain sensitiveness to the forms of nature. Indeed, it is just this sensitiveness which Scott does not possess. Again, the description of the mountain ash in the sixth book of the "Excursion" cannot be overlooked by any one who has once remarked this noticeable tree of Scotch scenery, affording too, as it does, an example of the characteristics of which we have just spoken:—

"The mountain ash
No eye can overlook, when 'mid a grove
Of yet unfaded trees she lifts her head
Deck'd with autumnal berries that outshine
Spring's richest blossoms; and ye may have mark'd
By a brook-side or solitary tarn
How she her station doth adorn; the pool
Glows at her feet, and all the gloomy rocks
Are brighten'd round her."

As we have said, the weak side of this kind of description is the baldness and excessive minuteness from which from time to time the poet cannot escape. But setting this aside, there can be no doubt that in Wordsworth we see the real poet of the scenery of the Highlands, and indeed of the British mountain scenery in general, rather than in Scott, who is the great and immortal story-teller of the North. Yet whilst comparing these two remarkable men in regard to one particular subject it must not be supposed that we desire to weigh them in the balance in the general scale of poetry. But it is certainly interesting when we are rapidly approaching the season for mountain rambles to study the striking difference which exists between Scott's and Wordsworth's treatment of mountain scenery, both in form and in thought. Neither can such a study fail to produce suggestions closely connected with the depiction of natural beauties, whether of mountain or lake, and to cause a greater appreciation of the landscape-painter's work.

Sheffield Society of Artists.—The second annual exhibition of pictures under the auspices of this society was opened on the 18th inst., in the School of Art. The *Sheffield Independent* states that several of the most important contributions to the exhibition are from artists who are not members of the society. Mr. William Poole is the president of the society this year.

BRIDGNORTH.

IT may fairly be said that England, as a whole, is but little visited by its own people; there are some parts, it is true enough, where strangers do much congregate, such as the lake district and certain portions of the south coast. But its cathedral towns are visited much more by Americans than by Englishmen, unless the latter happen to be in a particular locality for some reasons unconnected with the mere scenery of the place. Much less known are those portions of the country, full of very charming scenes, where one may be more secluded and more quiet than hundreds of miles away amongst the valleys of Switzerland, or on the sides of the Italian lakes. One such district is the Severn Valley,—a characteristically English landscape, but both in spring and autumn full of delightful scenery. Where there is water, there, it may be said, as a rule, is some kind of natural beauty, and the valley of the Severn is no exception to this rule, for the Severn, with its rapid steams, its shining pools, is the centre of two lines of sloping hills, very rich in all kinds of tree and wildflower. On its grassy banks the oak in June is brilliant in its delicate green foliage, and the elm-tree and the large-leaved chestnut stand in contrast side by side. Indeed, the whole valley of the Severn was once a portion of some of the most noted English Mediæval forests: there was the great forest of Wyre, near to where the town of Bewdley stands, as Leland has it in a doggerel line:—

"Fair-seated Bewdley, a delightful town,
Which Wyre's tall oaks with shady branches crown."

Higher up the stream came the forest of Morfe, a vast tract which now only exists in antique legends and in local names. And when we arrive at the forest of Morfe we are brought to the town of Bridgnorth, the Ehrenbreitstein of England; and even now, in many respects, the most striking of English towns. It is true, we have no height crowned, as at Durham, by the noble Norman cathedral which overhangs the Wear, but we have a town equally finely situated, and surrounded with country infinitely more picturesque than that overlooked by the city of St. Cuthbert; for Bridgnorth stands on a rocky promontory more than 180 ft. above the Severn, and on the extremity of this precipice once was the castle of Bridgnorth. From the top of the south-eastern bank of the Severn, from what is known locally as Hermitage Hill, is to be seen one of the most striking views in England,—a steep and well-wooded foreground slopes to the Severn, and on the opposite bank are the houses of the lower town, and clinging to the rocks above yet more houses, and on the top stands the old town,—the single piece of ruin which marks the position of the old castle of Bridgnorth, and to the right the square tower of St. Leonard's Church and the gables of the Grammar School; whilst beyond, the misty outlines of the Wheatland Hills break the skyline. The history of Bridgnorth is a story of war; for no town in Mediæval days could be situated as Bridgnorth was without being a coveted prize and a desired stronghold in every internal war. A bridge was here built, it is said, by the Saxons over the Severn, and when this was destroyed, a new one was erected, from which the town took its name. Founded by Ethelfleda, daughter of Alfred the Great, and enlarged by the vigorous and warlike Robert de Belesme, Earl of Shrewsbury, who rebuilt the castle about 1098, we find it besieged by Henry I. in 1102, and on its surrender handed over to Hugh de Mortimer, who, in 1155, after his rebellion against Henry II., surrendered the castle into his sovereign's hands. Other stirring incidents occur in its history, till, in 1646, it was the scene of a severe siege by the Parliamentary armies, who, after a remarkable struggle, succeeded in capturing the church, and finally obtained the surrender of the garrison of the castle; of this castle, as we have said, only one block or piece of ruin still remains, but it is enough to suggest to the sympathetic onlooker the scenes of which it has once been the centre; the easily defended rock commanding the passage of the Severn, the oaks of Morfe hiding the southern winding of "Sabrina fair," and the fertile country which Bridgnorth dominated to the north. The main street,—the High-street of Bridgnorth,—"one very fayre street," as Leland calls it in his "Itinerary," is still very noteworthy. When he wrote (*temp.* Henry VIII.) the streets "were galleried, as in Chester"; those galleries or rows have now disappeared, but there yet

remain numerous old black and white houses and some modern ones of a similar character built in this style to keep up the antique nature of the town. In the centre of the High-street is also a black and white market-house, raised on four pillars, so that the basement floor is on a level with the first floors of the surrounding houses. This structure is one which we hope will long remain intact, because it carries the visitor back very vividly to times in which Bridgnorth was not a mere country town, but a fortress of great strength, the mistress of an important district of England. We have already mentioned the old church of St. Leonard, a building erected of the red sandstone which underlies the surface throughout this part of Shropshire. It was restored some twelve years ago, but its size, its situation by the old gables of the school-house, looking over the valley of the Severn from the green lawns which surround it, place it in thorough keeping with the character and history of the town. From the fact, too, that Bridgnorth does not perceptibly increase in size, it is possible to grasp its former character more easily, because when one sees a town such as Chester lying in a flat and uninteresting country, with walls still existing, but forming a mere infernal ceinture, it is not possible to take a view of the place, so to speak, as a whole. But with Bridgnorth it is different: the picturesqueness of the surrounding country, the Severn flowing down, with "glassy, cool, translucent wave," as when Milton wrote of it, the church and the ruins on the stolid rock, and the comparatively small town which crowns the summit, bring before the mind's eye the strong fortress of the past, and we forget the quiet market-town of to-day, and remember only the natural stronghold made more formidable by military art, and frequented in Mediæval times by many kings. "In March, 1204, King John was again at Bridgnorth, with him a noble retinue such as none but a great fortress could have sufficed to accommodate." Such is one example of the estimation in which Bridgnorth was held four centuries before "Comus" was performed at Ludlow Castle.

ANCIENT REMAINS IN COLORADO, U.S.

THE tenth annual report of the United States Geological and Geographical Survey of the Territories, conducted by Dr. Hayden, the U.S. geologist, contains, like former volumes, very important contributions to archæology.* The present report by Mr. W. H. Holmes embraced the result of surveys over about 6,000 square miles of the Pacific slope of the Colorado portions of the adjoining territories. This land, though now a semi-desert, owing to its intersection by deep cañons, formerly supported a numerous population "totally distinct from the nomadic population who hold it now, and in many respects superior to them."

The ruins described are principally those of stone structures, and are abundant in the vicinity of water. They may be classed as (1) lowland or agricultural settlements; (2) cave dwellings; (3) cliff houses or fortresses, the latter being places of refuge or defence.

"In form, the parallelogram and circle predominate, and a considerable degree of architectural skill is displayed. Where the conformation of the ground permits, the squares are *perfect* squares and the circles *perfect* circles. The greater part of the ordinary structures are square or rectangular; while attached to each group, and sometimes without indications of contiguous buildings, are circular ruins frequently resembling towers. These are the most pretentious structures, being often as much as 40 ft. in diameter, and in many cases having double or triple walls. They are solidly built of hewn stone, dressed on the outside to the curve, neatly jointed, and laid in mortar.

In the larger towers the space between the outer walls is invariably divided by heavy partition-walls into a number of apartments, while a circular depression, or *estufa*,† occupies the centre of the enclosure.

It seems evident, from the extraordinary form of these structures and the unusual care shown in their construction, that they were not designed for the ordinary uses of dwelling or defence. It has been observed that, among nearly all the ancient tribes of North America, the grandest and most elaborate works of art were the offspring of their superstitions, and it does not seem at all improbable that these great towers had a religious origin.

In the inhabited pueblos of to-day there are underground rooms, frequently circular, used as council-chambers as well as for the performance of the mysterious rites of their religion. Similar chambers occur, according to Lieutenant Simpson,* in all the ruined cities of New Mexico, but having single walls of no great height or thickness. It is stated by Squier and Davis† that in Mexico the sacred enclosures were also used for defensive purposes, and it certainly seems probable that these curious structures served both as temples and fortifications, and that the apartments between the walls were the receptacles of sacred or valuable property."

Besides the architectural remains, stone weapons and ornaments, painted and carved inscriptions, pottery and human remains were met with, and examples are figured, but there is nothing to show that metals were used.

Evidence of great antiquity is seen in the extensive weathering of the rocks which has taken place, and sometimes in the growth of trees 300 or 400 years old, which deeply embed worked stone in their roots or sides; but no guess at their approximate age is made in this work. It is inferred, however, from the comparative freshness of the cliff-houses, that these are newer, and were built towards the close of a long occupation.

The remains are by no means cyclopean, and seem to indicate that they were the dwellings of a small race. The masonry is neatly joined, and appears to have been dressed with stone implements, but no single stone is larger than could easily be lifted by one workman. The cave dwellings are shallow and irregular apartments, or rather nests, communicating by apertures which would not allow a person of large stature to pass. What they possess of picturesqueness and grandeur is due to the now frequently inaccessible positions in which they are placed, and to the overhanging ledges caused by uneven weathering of the rocks. Thus the engraving, pl. xxxii., of a cave town on the Rio Mancos resembles a great ruined castle with overhanging copings and cornices, perched on a craggy height. The openings of the caves were walled up with masonry, except a small door-like orifice.

Plate xxxiv. presents a view of one of the fortress towers, of which there are many noticed, and may be taken as a typical example. It consisted of a central tower 25 ft. in diameter, with walls 21 in. thick, and this was surrounded by an outer wall, with a space between them divided into ten chambers, the total diameter being 43 ft. It is surmised that the outer wall had no windows or doors within reach from the ground, but that ingress was through apertures high up, and reached by ladders, the small openings, 6 ft. from the ground, that do exist in the central tower being indoor communications. Abundant traces of ruined dwellings surround the fort. Another tower is larger and triple walled, and is environed with low lines of rubble, marking the positions of crowded rectangular dwellings attached to it.

The next plates illustrate cliff-houses of the Mancos. These are located in grooves left by the weathering of a bed of shale between layers of sandstone, and vary according to the accidents of their position. One range is limited by the rock structure to about 4 ft. in height and 6 ft. or 8 ft. depth, and placed some 40 ft. above the river. From appearances it would seem impossible to assign to it any great antiquity. Another group described occurs within 100 ft. of the top of a cliff 900 ft. high, and consists of two tiers 30 ft. apart, set in niches. The lower house occupies the entire niche, and is 60 ft. long and 15 ft. deep in the deepest part, and 13 ft. or 14 ft. high, the front wall being flush with the precipice. It is divided into chambers, the arrangement of which is both complicated and curious. The main feature is a circular chamber or *estufa*, whose only entrance seems to have been by a narrow tube-like passage, 22 in. high by 30 in. wide and 20 ft. long. The object of such precautions the author believes to be the desire to render a sacred chamber as free as possible from profane intrusion. The upper tier is only accessible by a stairway of niches cut in the sloping face of the rock. The stairs lead to the doorway, and there is no standing room outside the walls. An immense arched rock roofs in and projects 15 or 20 ft. beyond the building; above and below, as well as at each side, the cliffs are almost vertical, the only approach being by the stairs, so that the position is one of unparalleled security. Beans and corn and evidence of fire were found in the upper house, and rush matting and vegetable tissue in the lower. An even more perfect two-storied house, photographed by Mr. Jackson in 1874, in a nearly equally inaccessible position, is illustrated.

One of the most important groups of ruins, forming "the most imposing pile of masonry yet found in Colorado," is situated near a spring known as "Aztec Springs," which seems to have finally ceased only a few years ago. It is estimated to contain 1,500,000 solid feet of stonework, all of which had been carried more than a mile from its outcrop, and covers an area of about 480,000 square feet. It consists of two houses, one a little higher up the slope than the other. The upper one has double walls 26 in. thick, still in places 12 ft. to 15 ft. in height, with a space of 7 ft. between them, and it is conjectured that they were formerly at least as high again. It is rectangular, measuring 80 ft. by 100 ft., and is surrounded by a network of fallen walls, comprising, as usual, a well-defined circular *estufa*. The lower house is simply a large court, 200 ft. by 180 ft., also enclosing an *estufa*, and with eight small equal chambers extending along its northern length.

The survey of the ruins situated in this area was hurried, and is by no means to be taken as an exhaustive one; indeed, whole series are said to have been passed without even a halt.

The rock-inscriptions which are figured are assigned for the most part to the cliff-builders, and this with every appearance of probability. They seem to record events, and are chiefly made up of extraordinary and perhaps symbolical portrayals of the human figure. The pottery is superior in composition and surface-finish to much that is made by the town-building tribes of to-day. Fragments are found in immense quantities in the neighbourhood of the ruins,—mostly of bowls, handled cups, and ladles, more rarely of jugs and vases. No wheel was used in their production, nor any implement, except for modelling the surface into ornament. It is thin and light, and few specimens are unornamented either with painting or sculpture. The painted vessels were thinly coated with "some mineral solution that gives a beautiful enamel-like surface, not greatly inferior in hardness to the vitreous glazing of our potters." Upon this surface the colour is laid, apparently with a brush. In one or two cases the indented ware has a light gray surface coating, that on the broken edges has quite a perceptible thickness." Restoration of a number of the vessels are given on plates xliv. and xlv., and one cannot but be struck with the almost elegance of form and the richness of their ornamentation. One bowl with a scroll-pattern is peculiarly Greek-looking, and many indicate a considerable amount of care and skill, hardly to have been expected, to judge them by the rudeness of the rock-cut inscriptions, and in a race totally unacquainted with metal.

The *résumé* of the author's conclusions is, in his own words:—

"My conclusions in reference to the history of the ancient inhabitants of this region, as drawn from my observations among the ruins, briefly outlined, are as follows:—

The ancient peoples of the San Juan country were doubtless the ancestors of the present pueblo tribes of New Mexico and Arizona. A comparison of the ancient with the modern architecture and a consideration of the geographical relations of the ancient and modern pueblos lead very decidedly to this conclusion. They have at one time or another occupied a very extensive area, which includes the greater part of the drainage of the Rio Colorado. Their occupation of this region dates back very many centuries, as attested by the extent of the remains and their advanced state of decay.

The final abandonment of the cliff and cave dwellings has occurred at a comparatively recent date, certainly subsequently to the Spanish conquest.

The lowland remains, the extensive pueblos and great towers, are generally in a very much

* Washington: Government Printing Office. 1878.

† *Estufa* is a Spanish word, signifying "sweat-house," or council-house (now applied to the hot chambers in which Spanish and Portuguese wines are matured). In the inhabited pueblos of to-day, the author informs us, there are underground rooms, frequently circular, used for religious rites and council-chambers. It is stated that in Mexico the sacred enclosures also served defensive purposes.

* Expedition to the Navajo Country, p. 78, &c. See also Mr. Jackson's Report.

† Ancient Monuments of the Mississippi Valley, p. 102.

more advanced state of ruin than the cliff defences. It is possible that the latter owe their construction to events that immediately preceded the expulsion of the pueblo tribes from this region.

The cliff-builders were probably not greatly superior to the modern pueblos in any of the arts, and I doubt if they could boast of a state of civilisation equally advanced.

It should be remembered that, up to this time, no excavations whatever have been made among these ruins, and I feel as if more information should be obtained before attempting to draw other than very general conclusions. It seems to me probable that a rich reward awaits the fortunate archæologist who shall be able to thoroughly investigate the historical records that lie buried in the masses of ruins, the unexplored caves, and the still mysterious burial-places of the south-west."

The second report contained in this volume, by Mr. William H. Jackson, will be noticed in a future number. J. S. G.

OLD ARCHITECTS IN OLD GARDENS.

THE Hanging Gardens of Babylon, the Terrace Gardens of Rome, the Winter Gardens of Russia,—all historic gardens, indeed,—have been more or less associated with architecture and the builder's art. Wherever, in fact, they have been laid out on any formal, or scientific, or magnificent plan, the employment of stone, or marble, or the ornamental materials dug from rarer quarries, has been found essential; so that, in preparing an open space, natural or artificial, level with the common ground, or raised above it for luxury and pleasure, the one science has, in every age, been associated with the other. This is a truth pointed out everywhere,—in the Scriptural records, and by the monuments of antiquity; in the most ancient parks of China, belonging to unknown dates; as at Fontainebleau and at Peterhof; as in the "pleasaunces" of Charlemagne at Aix-la-Chapelle; in the traditions of Alcinous, as in those of Nero. Sculpture and painting, no doubt, have also lent their aid to the service of the gardener; but from the time when, according to the most venerable lore upon this subject, Nebuchadnezzar, to satisfy a wife who sighed for the Median hills and forests, and wearied of the monotonous Babylonian plain, reared his huge truncated pyramid, and covered its surface with verdure, to those of Chatsworth, the architect has invariably been called in. Nothing approaching to the glories,—altogether imaginary, however,—which inspired the genius of John Martin, has been attempted in modern days; but the pride of Semiramis led her to emulate them upon a reduced scale, and the palace of Alexander was enriched by columns, around which were trailed mimic vines, bearing grape-clusters of solid gold. And so with the parks that surrounded the celebrated royal residences of Khosrou, with those of the Persians and the Arabs, including the Sultan Aboul, who clothed his palm-trees in cases of gilded copper. The Moors erected their alcazars amid flower-planted arcades, painted in vermilion, gold, and blue; and the Imperial gardens of Constantinople were divided by porphyry parapets one from another. An even more prodigal taste, in this direction, is to be recognised in the Mogul Gardens of Agra, Delhi, and Kashmir, of Oude, and the capital of Ispahan. The first conquerors who entered Mexico discovered vast parks enriched with sculptures, balustrades, basins, and conduits composed of, or lined with, various brilliantly-coloured stones, many of which were not produced by the quarries of the country itself; while, as to the Greeks and Romans, a garden without a temple, a colonnade, a cupola, or a recessed niche, was never contemplated. Marble is not less necessary than earth, said Cicero. The grounds encompassing the ruins of Hadrian's Villa, at Tivoli, exhibit remains which prove the importance attributed to the one art in relation to the other. Unfortunately, the imitators of later epochs exaggerated and degraded this style, as shown by the Pompadour fashions, towards the close of the eighteenth century, when sham grottoes, columns in unmeaning clusters, miniature pyramids, and colossal vases deformed the most exquisite sites. A nobler spirit presided over the superb pleasure-grounds in which the Emperor Justinian, the Caliphs of Bagdad, the Dukes of Genoa, and the Florentine Medici, in their different days and generations, alike delighted. It was not, therefore, the caprice of any particular era; it has been the instinct of mankind from the commencement to link architecture with gardening. A taste which can be followed through Persia and Assyria, Greece and Rome, India and China, to France, England, modern Italy, and even Russia, is not of an age, but of all time. The celebrated gardens of Isola Bella, in the Lago Maggiore, would not exist were it not for the arches which, with their foundations deep down below the water, and coated with a bituminous cement, uphold them. It was more or less from suggestions supplied by the ancient examples that the gardens known as those of Charlemagne, at Aix-la-Chapelle; of Kroll, at Berlin; of Greenwich and St. James's, designed by the Frenchman Le Notre; of Kensington, Esher, and Claremont, were planned, though a distinct originality attached to the floating islets, covered with the most brilliant and often artificially-covered vegetation, and sprinkled with little architectural fancies, on the lakes of Mexico, and of Cuzco, in Peru. We see the same antique influence, transformed, yet still vital, everywhere, in the new gardens at Vienna, as in those of Ghent, of the Luxembourg, Palais Royal, Versailles, Chantilly, and Malmaison: they have all been "built" as well as cultivated. Precisely so, again, with those of the Aldobrandi and Pamphili at Rome; while, in Spain, that of the Alhambra would lose nearly all its characteristics were it not for the exuberant prodigality of the Saracenic architects; for the Alhambra "gardens" are rather "courts" than anything else, exactly as are those of the palaces that border the Ganges,—parallelogrammic enclosures paved with marble, cooled by fountains, very scant of flowers or verdure, and relying for their splendour principally upon those mosaics and tesselations in the manipulation of which their Moorish artists stood unrivalled.

If the European fashion has not quite followed the Asiatic, it has often gone very near to it, as in the great elliptical colonnade encircling the lake at Monceau, the double balustraded staircase and Medici fountain of the Luxembourg, the arcades and bronze Eurydice of the Palais Royal, the Temple and cloister in the Garden of the Innocents, and the marble kiosks of the Tuileries. Keeping the retrospect, however, more especially in view, we find this architectural ambition at work, naturally enough, at Cordova, Toledo, Valencia, Seville, and Granada, where the Oriental tradition was strictly adhered to. The third and greatest of the Abdulrahmans, indeed, has the credit of constructing in the grounds surrounding his palace at Zahra,—relics of which attest its magnificence,—a pavilion of marble enclosing a miniature lake of quicksilver, which, by a secret machinery, was kept in a state of continual commotion, resembling [illegible] in a storm. But, throughout the East it will be found that those who designed these luxurious retreats, rarely thought of walking in them. Therefore they erected bellevues, alcoves, little temple-shaped sanctuaries without walls, arcades furnished with seats, or, as at Rome, towers, such as have been reproduced, in modern times, at Genoa and Naples. It was in Italy, indeed, that this style assumed its highest splendour, and longest survived. No garden of the sixteenth century was regarded as complete without a certain display of architectural pomp. "The architect," said one of those who laid out the pleasure-grounds of the Aldobrandi and Pamphili palaces already alluded to, "who built the house should make his re-appearance in the garden." And an Eastern writer seems to echo him when he asserts "wherever there is a palm there should be a minaret," while, wherever there is a beautiful sea or river prospect, his translator adds, there ought to be a belvedere. The Chinese, from the most remote epochs, caught, in their quaint way, at this idea, and have never looked upon a garden as perfect, unless built over with bridges, grottoes, cascade-arches, miniature pagodas, artificial rocks, and pavilions. Travellers smile at these grotesques; but, on the outskirts of Paris, in the very centre of the very newest civilisation, we have them reproduced,—imitation tombs and ruins, caverns, arches of brick and stone, and gigantic iron gates opening upon nowhere. The Jews almost always erected a tower in the middle of their gardens, and, relative to those encircling the mythical splendours of Adhoya, their buildings are spoken of far more emphatically than any of the rest. The thirteenth Louis of France had probably heard of this tradition when he, insisting on constructing, in the midst of his "paradise" at Chinon, Mehun-sur-Yèvres, a "Castle of Beauty," with, sprinkled about it, restorations of the Chapel of Amboise and the tombs of the cardinals in Rouen Cathedral. In one part of England, long ago, an effort was made to resist this "stone-work" taste; and the "School of Kent," as it was contemptuously termed, proscribed all avenues terminating in marble alcoves or Grecian temples, all terraces, balustrades, fountains, vases, statues, and artistic sculptural and architectural decoration whatsoever, leaving only blazing banks of flowers, dark clumps of trees, and great sweeps of lawn. But the steady force of fashion, with the impulse of measureless epochs behind it, overswept this local and partial protest, as is evinced at St. Germain, Meudon, Sceaux, and St. Cloud,—all comparatively fresh from the Mint, yet with something of the antique stamp upon them; as at Chatsworth, Alton Towers, Warwick and Kimbolton Castles, in the Tudor days; Hampton Court, Longleat, Audley End, and Blenheim. The Dutch, it may be said, in their punctiliousness and, so to speak, pride, repudiated the architect in the garden indignantly; yet who, if not Vanbrugh, confessed that flights of steps, balusters and piers, topped by vases and copings, Italian or Gothic, cupola buildings, arches over sunk paths, French pavilions, Italian loggias, Georgian belvederes, and even rustic cottages and sham ruins, may add adornments to a garden landscape?

THE LATEST LIGHT AS TO RAILWAY DIVIDENDS.

THE fall which has occurred in the prices of the home railways, coincident with the diminution in dividends already declared or announced, (with the brilliant exception of the Metropolitan line) is a matter deserving careful attention. There are two points of view from which railways are regarded, or may be regarded, by the public; namely, the speculative and the scientific. With the first we have no concern, except to point out that it has been speculative investment, or the origination, for speculative purposes, of schemes for lines not really needed by the country, to which all, or nearly all, railway misfortunes, of a financial character, may be either directly or indirectly traced. On the other hand, it requires a certain amount of that knowledge which is proper to the expert to form any sound opinion on facts; while, as we have too often lamented, it appears to be a settled policy on the part of most railway managers to allow only the smallest number possible of facts to be communicated to the shareholders. It is our belief that this is a mistaken policy. But it is that which is now prevalent; and even the efforts of the Board of Trade to obtain adequate information have been hitherto in vain.

Commencing with the Metropolitan Railway, of which the half-yearly meeting was held on the 16th of July, it is worthy of note that the total expenditure on capital account, which stands in the "Index to our Railway System" as 8,851,139*l.* at the end of 1877, was given by the chairman as 8,709,547*l.* at the end of last half-year. Owing to the sale of surplus property and other good management the capital account now stands actually at 260,000*l.* less than it did in 1872. Here is a matter for the highest praise, and a nucleus of prosperity that well deserves imitation. To earn the gross income of 268,702*l.*, the sum of 94,120*l.* had been expended, being a working cost of little over 35 per cent. of revenue. Thus, although the receipts for the first quarter of 1879 showed a decrease of 2,319*l.*, the Metropolitan has presented to its shareholders an honest dividend of 5 per cent. out of a net earning of 5¼ per cent.

The increase of the capital of the Brighton line for the six months has been 334,862*l.* The gross revenue showed a decrease of 30,240*l.*, as compared with the corresponding half of 1878; and the working expenses show an increase of 420*l.*, while 14,681*l.* is required for additional interest. A deterioration at the rate of 90,000*l.*, a year on a revenue of 1,917,369*l.* (that for 1877) is not a feature of a very alarming kind in a period of general depression. But that a loss of gross earnings of 30,000*l.* should be accompanied by an actual increase of working expenses is an ugly feature which demands explanation. The best that can be said about it is, that it appears to be an evidence of a fair mode of keeping the revenue account,

as not in any way watered by the aid of unacknowledged capital.

The South-Eastern directors, in the reports communicated to the newspapers, are silent on the subject of the increase of capital. The decrease in gross revenue has been 44,325*l.*, and that in working charges 8 942*l.*, in the half-year, so that only 1*l.* has been saved where 5*l.* less revenue has been earned. The increase of capital, according to the "Index to our Railway System," has been 117,543*l.* in 1878; and the decrease of receipts for the first quarter of the present year, according to the same authority, was 23,083*l.* The gross increase for the half-year was 1,066,069*l.* There has been an evident effort to keep down working costs (possibly by reducing the number of trains), and the parallel thus afforded to the Brighton line is an evidence in favour of the good management of both these passenger lines during a period of depression.

The third number of Mr. Fleming's "Index to our Railway System" is unusually valuable for the information which it reproduces from the accounts of the companies themselves.* Thus, while the analyses of the Board of Trade returns only come down to the end of 1877, the incomes of the principal companies are returned as late as the first quarter of 1879. A total decrease of earning of 426,692*l.* is shown on the income of thirteen lines for thirteen weeks, and of four lines for nine weeks; so that we may take it that our railways are now earning about two millions a year less than they did in 1878, at an increased proportionate outlay. The greatest decrease of gross income in the quarter has been that of the North-Eastern, viz., 111,384*l.* The greatest increase, that of the Great Northern, 31,298*l.* The only other increase (with the exception of one of less than 1,000*l.* on the Metropolitan District) has been 15,031*l.* on the Great Eastern, a line which it is already announced will pay no dividend on the ordinary stock for the half-year. It is probable that the 46,329*l.* thus added to the receipts of these two lines may represent the diversion of mineral traffic to that extent from the London and North-Western, which took 88,821*l.* less in the quarter. As to this, further light will be perhaps attainable when we come to see the increase or decrease of the respective working costs. We think that the indication of the late date to which Mr. Fleming has brought down his information is due to the pains that he has taken in the matter. It is unnecessary to add how valuable this work is to all persons who take a really intelligent interest in railway property.

* The Index to our Railway System and our Leading Lines: a comprehensive Analysis of Railway Property. 1878-1879. Third number. By William Fleming. London: M'Corquodale & Co. 1879.

FROM THE BANKS OF THE SEINE.

THE three principal subjects of interest of last week in Paris must undoubtedly be considered the interment of the Prince Imperial, the grand review of Sunday, and—the weather, and in writing from the banks of the Seine it is difficult not at least to refer to the place they each have held, in different degrees, in public attention.

But professional interests, even in the midst of grief, pleasure, and discontent, receive no less consideration, and the observant stranger who may have been tempted to the capital for the Sunday military fête at Longchamps could not fail to notice many changes in Paris, even since last year's visit to the Exhibition. In every direction scaffold-poles meet the eye, to right and left, in every quarter, and within the last few months many a quiet market-garden and undisturbed corner have been "Aladdinised" into towering houses and mansions. Little wonder need there be when the kind aid of statistics proves that no fewer than 3,995 new houses were built in Paris in 1878; the demolitions reaching the respectable figure of 1,998, showing an increase of some 1,997 new dwelling-places in the capital; and the monthly reports for the present year show no diminution in the successful advance of the building trade. Paris is doing its best to merit the reputation it has so long held of being "the capital of Europe"; let us hope that London may equally remember that if Talleyrand so complimented his native city, he remarked of London that it was the capital of the globe.

Paris and London have this season been drawn much more into contact than they have been for many a generation, by the successful visit of the French Comedy and the recent generous *fête* at the Albert Hall in favour of the French Hospital; so it is no surprise to see in the advertisement-sheets of most of the journals here the announcement of "the Royal London Panorama," to be situated "in one of the finest quarters of the English capital," and "the like of which does not exist in the United Kingdom." M. Gerôme (who, it will be remembered, is a foreign member of the Royal Academy) and M. Boulanger, with several collaborateurs, have accepted "the artistic patronage of this creation," which from all accounts, is to be amusingly French from commencement to end, and, under the direction of "a talented architect, a pupil of the École des Beaux Arts," the façade is to be adorned with groups and statues, the genius of England from the prow of a vessel decreeing palms to the heroes whose names are to be carved on the façade.

Although the so-called Coliseum in the Regent's Park, and its neighbour, the Diorama, are well remembered by old Londoners, the former chiefly for its unhappy connexion with John Braham (the father of Lady Waldegrave, whose death is deeply deplored on the banks of the Seine by many here who remember her in the society of London and Paris), the latter by its views of Paris, among other familiar Continental scenes, and notwithstanding the lingering success of the Panorama of Leicester-square, and its skilful representation of our famous naval achievements, there may be still in the present day an opening for the speculation of such well-known artists as Gerôme and Boulanger showing on the banks of the Thames their method of panoramically amusing Londoners.

Exhibitions succeed each other in Paris with a rapidity which is not a little puzzling, but which does no small degree of credit to the power of organisation of the professional world of Paris. The doors of the *Salon* barely closed, we see announced for the 24th inst. the inauguration of the Exhibition of Sciences applied to Industry, to be held in the Palais de l'Industrie, and to be open till November. The programme which is so far published holds out an interesting promise, and the opening day is expected with no little impatience.

While the latest invention of science, the practical use of the electric light, is enabling the workmen to continue their work uninterruptedly night and day at this Exhibition, an echo reaches us from the world of nearly a hundred years ago,—a discovery among the dusty packages that lined the upper shelves of the library, alas! now for ever closed, of the dear old Théâtre Italien. The library of the Conservatoire purchased in April last a large number of musical scores, and among a lot knocked down to the librarian for a couple of shillings has been found an autograph score of Giuseppe Haydn, entitled "La Vera Costanza," a three-act opera which has never yet seen light. The score, written almost entirely by the hand of the famous composer, bears at the end in his own writing, "Fine dell' Opera. Laus Deo, 1785."

A few days ago Paris saw its numerous parti-coloured hoardings adorned with an attractive yellow bill announcing the sale of the Château de Menars for July 16, and certainly it must have startled more than one reader to see so tempting a property, with its five hundred hectares (some 1,250 acres) of land, put up at so reasonable a rate as 500,000 francs (20,000*l.*); and the matrimonial difficulties of the Prince de Bauffremont, it may be stated in a few words, are the cause of this veritably princely mansion having come into the market. Menars, though not one of the oldest, is one of the most imposing of the many picturesque châteaux of the Loire, familiar to the professional world. Only the other day we saw sold, after some spirited bidding, at Madame Musard's sale in Paris, the well-known work on the Châteaux of the Loire. Built, it is said, by Mansart, Menars was given by Louis XV. to Madame de Pompadour, and hence it is that with the property is acquired the right to the marquisate. After the Revolution, Napoleon presented Menars to Victor, Duc de Belluno, in whose hands the château remained till his death; the subsequent owners of the château it is of little interest to mention. The fortunate purchaser of this old family mansion, whether he claim the marquisate or not, may indeed be envied his possession, though he will have had to rely almost entirely on the picturesque, even if legal, enumeration of the charms of the château as set forth in the large bills already referred to. Doubtless more than one meditative American must have been attracted by the announcement of that bill with its rough enumeration of the property, leaving ample room for the romantic imagination of the innumerable undescribed charms of an abandoned château, built at a period at present even more appreciated in France than in England. Fortunately for hesitating purchasers (difficulties, it appears, having been thrown in the way of inspection), the Paris *Globe* some days since informed its readers very opportunely that the château of Menars has never been really abandoned. The fortunate purchaser will find distributed over the château, in the taste of the century to which it belongs, a whole allegorical and mythological army of decorations; emperors and goddesses; Cæsar and Aurora, Titus and Flora, Vespasian and Zephyr, Marcus Aurelius and Abundance; the divinity of the place, represented under the features of Madame de Pompadour, showering down upon her favourites flowers and riches with all the grace that belongs to the period when Couston and Coysevox exercised so skilfully their industrious chisels.

The historical dates of the end of the last century have within the last few days been showered down rather plentifully on the public in connexion with the anniversary of the fall of the Bastille, but surely in no stranger manner than in an incident of the sale of the Château of Menars. We have spoken of this historic château and its collection of interesting statues, the sale of which gathered together not a small crowd of would-be purchasers at the Tribunal, the property being eventually knocked down to M. Waltel, a municipal councillor, for the sum of 920,000 francs (about 37,000*l.*). But just as the adjudication was made, a courier from the Minister of Fine Arts suddenly appeared, claiming in the name of the Government the famous statues,—a collection of *chefs d'œuvre*,—which adorn the gardens of the château; the Minister declaring that "he opposed himself formally to the sale of these statues, precious objects of art, and of great value, which were carried off from the museums of the State in 1792, and placed at Menars, without their having, however, ceased to be the property of the Government." We shall soon, we may suppose, hear more of this amusing and really national incident, which the law courts will have shortly to decide.

An interesting link with the close of the last century has been recently snapped in the announcement of the death, at the age of ninety-three, of Mme. la Marquise de Bonnay, widow of the Marquis de Bonnay who presided over the famous Assemblée Nationale of 1789.

Since we are speaking of ladies, it may not be uninteresting to some readers to learn, on the authority of the *Gazette des Femmes*, that no fewer than 876 lady artists exhibited at the last *Salon*; in sculpture there were 31 exhibitors; in portrait and figure, 138; in painting on porcelain, faïence, and enamel, 277; in water-colour and *gouache*, 112; the remainder being divided among miniature, fruit-pieces, pastel, and engraving, there being some 21 lady engravers and lithographers. And let it not be believed that the greater part of the exhibitors are amateurs. Seventy-three have been recompensed (without mentioning Rosa Bonheur, who is decorated with the Legion of Honour), there are 14 first, 19 second, and 39 third medals, with numerous honourable mentions,—an encouraging piece of statistics.

By the vote of the National Assembly, which decided not long since on the return of the French Chambers to the capital, the municipality of Paris have been sadly put out; the Senate will occupy the Palace of the Luxembourg, where the Prefect and his officials have been installed for some years past, and which they were to occupy until the Hôtel-de-Ville was ready to receive them. In a recent meeting held by the Municipal Council was discussed the question of the temporary establishment of the Prefecture in the Pavillon de Flore, one of the wings of the Tuileries, that at the opposite end to the Pavillon de Marsan, a view of which appeared in the *Builder* on the 19th inst.; M. Viollet-le-Duc laying before the Council a report on the proposal, which it is feared will cost at least 40,000*l.*, if not more. The municipal councillors are in despair at the difficulties of raising such a sum, one member proposing to ask the Government to aid them, another having very pertinently demanded the reason of the

delay in the re-erection of the Hôtel de Ville. The director of the works being called upon to reply, explained that the delays arose "from different causes." The architect (M. Bailly) having wished to build a monument (we quote the director's words), complete from an artistic point of view, and really worthy of the city of Paris, serious study has been necessary. But now that the different causes of delay have been remedied, the Council may rest assured that the Hôtel de Ville will be completed in the course of the year 1881. With this explanation the Council returned to the discussion of their temporary installation at the Tuileries.

A COLLECTION OF REPORTED CASES RELATING TO ARCHITECTS, SURVEYORS, AND BUILDERS.*

BY E. S. ROSCOE, BARRISTER-AT-LAW.

Liability for Execution of Works.

A HOUSEOWNER who orders work to be executed from which, in the natural course of things, injurious consequences to his neighbour must be expected to arise, unless means are adopted by which such consequences may be prevented, is responsible for such consequences, even if he has entrusted the work to a contractor or other independent person, and even if he has adverted to the necessary precautionary measures in engaging such contractor.—Bower *v.* Peate, 1 L. R., Q. B. D., 321, 45 L. J., Q. B. D., 446 (1876).

[This case enunciates an important principle in regard to building operations. Thus, if, as in Bower *v.* Peate, the adjoining house ought to have been underpinned, and from an omission to do so by the contractor, it was injured, the house-owner who employed the contractor is liable in damages. But if a contractor is entrusted with work from which no injurious consequences can arise, if executed with due care, then the contractor alone is liable. For example, if a workman of a builder engaged in erecting a house were to knock a ladder over on to a passer-by, the contractor, and not the householder, would be liable for damages to the injured person. The above case seems also to show that a house-owner should obtain from a contractor an indemnity against any damage caused by work done in the execution of the contract.]

Liability of Trustees of a Building Fund.

AN agreement between a builder and the trustees of a building fund may be so framed as to limit the liability of such trustees under such agreement to the period during which they remain trustees. The agreement may also be framed so as to except such trustees from any personal liability, and to bind them only to the extent of the fund.—Williams *v.* Hathaway, L. R., 6 Ch. D., 544 (1877).

[Compare this case with Furnivall *v.* Coombes, 5 Man. & G., 736. These cases should warn builders to be careful how they enter into contract with persons, such as the holders of a fund for the erection of a church, who have only a certain sum at their disposal; and, on the other hand, serve equally as examples to such trustees to divest themselves of all personal liability, and to bind only the fund of which they are the holders.]

Agreement to let Land on Building Leases.

WHERE a landowner engages to let land to a builder on building leases, and to lend him a certain sum to assist him in the erection of a certain number of houses, to be repaid by a certain date, on the security of the houses to be erected, and the landowner, when some of the houses have been built and some of the money advanced, requests the builder not to continue his operations, and the builder desists, the landowner is entitled to recover back the amount so lent, though he has not advanced the whole sum which he agreed to do.—James *v.* Cotton, 7 Bingham, 266 (1831).

Approval of Buildings.

WHERE there exists a covenant or agreement by the purchaser of a piece of land that no building shall be erected thereon which has not been approved by the original OWNER of the land or by his agent, and the builder erects a structure without such approval, he will be ordered to pay damages for so doing.—Kilbey *v.* Haviland, 24 L. T., N. S., 353; 19 W. R., 698 (1871).

[It is important to notice that in this case the owner of the land observed that a building was being erected without approval, soon after its commencement, and the builder was duly and properly warned in regard to it more than once. The Court was subsequently asked to grant an injunction ordering that the house (which had been completed) should be pulled down. But though the Court possessed the authority to do this, it would not exercise this power, but would only order the builder to pay damages. Therefore it is clear that the uniformity or general style of the whole range of building was marred, and consequently it is obvious that if a builder commences a structure without its having been approved, the Court should be asked for an injunction to restrain the continuance of the building operations at the earliest moment, if the plans have not been approved.]

Failure to Complete Building Contract.

IF a builder, being unable to complete his contract, enters into an agreement to give up the contract and to receive a sum down, and to be paid for so much of the work as is done according to the valuation of a third party, and such agreement is acted upon, he cannot subsequently have this agreement set aside.—Ormes *v.* Beadel, 30 L. J., Ch., 1 (1861).

Determination of Third Person not an Award.

WHERE by an agreement between the builder and a house-owner the right of one of the parties to have or do a particular thing is made to depend on the determination of a third person, this is not a submission to arbitration, nor is the determination an award.—Wadsworth *v.* Smith, 6 L. R., Q. B., 332; 40 L. J., Q. B., 118 (1871).

[But where there is an agreement that any dispute about a particular thing shall be inquired of and determined by a person named, this may in effect be a submission to arbitration. Thus an architect's certificate falls within the principle of the above case, unless, even though in the form of a certificate, it is a decision upon a disputed point.]

Subject Matter of Tender.

A PROPOSAL to receive tenders for certain things to be sold (specifying no limitation or qualification) and an acceptance (also specifying no limitation or qualification) constitutes a contract to include the whole of such things.—Venn *v.* Commissioners of Public Works, 32 Beavan, 490 (1863).

[This case, which arose out of the sale of the stone contained in old Westminster Bridge, lays down as a principle an important rule in regard to the sale of old materials of a building, and has never since its decision been questioned.]

Bay Windows.

A BAY window is a building, and not a mere projection from a main building.—Lord Manners *v.* Johnson, 1 L. R., Ch. D., 673 (1875).

[Compare this decision with the previous and similar one of Western *v.* Macdermott, L. R. 1, Eq., 499.]

Weekly Accounts.

PAROL evidence is admissible to show that certain words in a contract have a peculiar signification in the building trade. "Weekly accounts of work" mean accounts of day-work only, and not extra work capable of being measured.—Myers *v.* Sarl, 30 L. J., Q. B., 9 (1860).

[In relation to this phrase, "weekly accounts of work," it should be borne in mind that customs vary, and therefore it does not follow that this phrase has this actual meaning at the present time.]

"Rebuilding" House.

A COVENANT or agreement "to rebuild" a house or any other building in a substantial and workmanlike manner does not involve the obligation to erect the new house in the same manner, and in the same style and shape, and with the same elevation, as the old building, though it must be placed on the same site.—Low *v.* Innes, 4 De G., J., & S., 286 (1864).

The Phrase "Present Style."

THE phrase employed in relation to the internal fittings of a house, "to be handsomely decorated according to the present style," is too vague and uncertain to enable a court of equity to enforce an agreement in which it occurs, so far as this phrase is concerned.—Taylor *v.* Portington, 7 De G., M., & G., 328 (1855).

Contract with a Corporation.

WHEN an architect or contractor enters into a contract with a corporation, such contract will not be binding on the corporation unless it be under seal.—Hunt *v.* The Wimbledon Local Board, L. R., C. P. D., App.; 48 L. J., C. P. D., App., 207 (1878).

[This case more immediately turned on section 85 of the Public Health Act, 1848 (11 & 12 Vict., c. 63), and section 174 of the Public Health Act, 1875 (38 & 39 Vict., c. 54); but it is also the latest authority for the above general proposition. It is noticeable particularly as showing the necessity for architects to stand on strict legal principles in dealings with public bodies such as Local Boards. Because it is further stated by the Court of Appeal that in their opinion, even if the architect's plans are used by a corporation, which acts not for its own benefit, but as trustees for a certain portion of the public, such a corporation would not be liable, on the ground that it had benefited by the work, as would be the case generally speaking if similar facts existed in a contract between an architect and a private individual.]

Rights and Liabilities of Architects and Builders so far as they are set forth by the French Code.

"Si l'édifice construit à prix fixé, périt en tout ou en partie par la vice de la construction, même par la vice du sol, les architectes et les entrepreneurs en sont responsables pendant dix ans."—*Code Civil*, livre iii., title viii., s. 1792.

"If an edifice constructed at a given price perish wholly or partially through the faultiness of its construction, even by the badness of its foundation, the architects and the contractors are responsible for it for ten years."

"Lorsqu'un architect ou un entrepeneur s'est chargé de la construction à forfait d'un bâtiment, d'après un plan arrêté et convenu avec le propriétaire du sol, il ne peut demander aucune augmentation de prix, ni sous le prétext de l'augmentation de la maind'œuvre ou des matériaux, ni sous celui de changemens ou d'augmentations faits sur ce plan, si ces changemens ou augmentations n'ont pas été autorisés par écrit et le prix convenu avec le propriétaire."—S. 1793.

"Where an architect or contractor is charged with the construction of a building by contract according to a plan agreed upon and arranged with the owner of the soil, he can demand no increase of price, neither under pretext of the increase of the workmanship or the materials, nor under that of alterations in, or augmentations to, such plan, if these have not been authorised by writing, and the price agreed upon with the proprietor."

COLOGNE CATHEDRAL.

THE yearly report (the thirty-seventh) recently presented by the cathedral architect, Herr Dombaumeister Voigtel, to the Association for the Restoration and Completion of Cologne Cathedral, in every other way highly satisfactory, contains the equally welcome statement that the two towers will be completed in the year 1880. The contributions during the past year (1878) having come in bountifully, the architect has been able to push the works on more rapidly, and there is now every probability that the estimated time of completion will be kept. At this stage of the restoration, therefore, a short statement of what has been done will prove interesting. The total of the sums received since the movement for completing the cathedral was practically taken up in 1842 amounts to 379,748*l.*, the total expenses in the same period having been 378,614*l.*

The works since the last report (1877) have been confined to the erection of the stone spires of the towers and the restoration of the part of the southern tower built in the Middle Ages. The spires of the two towers were half finished in May of this year, the time when the report on the progress of the work in 1878 was prepared. As the cubic contents of the material for the stone pyramids are continually decreasing, their completion in 1880, as already remarked, may therefore be assumed as certain. After, in the winter of 1877-78, the base of the

* See pp. 384, 421, 479, 579, 624, 651, and 770, *ante*.

southern tower had been replaced, and the erection of the scaffolding (160 ft. high) on the western and southern sides of the south tower had been completed in the spring of 1878, the work of removing the pinnacles, mouldings, and tracery was begun. It was soon found that the destruction wrought by the tooth of time had been so complete, especially on the western side, that the idea of partly restoring those parts was abandoned. All the ornamentation of that side of the tower,—including the pinnacles, finials, window mouldings and ribs, as well as the mouldings, tracery, mullions, and crests of the piers,—has been taken out; the new material employed being the hard Obernkirchen stone, on account of its great resistance to the influences of the atmosphere, in preference to the original material, Drachenfels stone. Although the work thus entailed in the southern tower is very tedious and involves great expense, the soundness of the piers is by no means impaired. The smooth facing-blocks have offered a far greater resistance to the exposure of three centuries. It was necessary to dress their surface to a depth of 0 8 in., until the sound stone was met with, which slight reduction, however, is of no moment in walls of a thickness of nearly 13 ft.

At the beginning of May, 1879, after the erection of the centering, the vaulting in the ground-story of the southern tower was commenced, with the arrangement intended for drawing up the bells. When this is completed, the erection of the new clock, constructed by Mannhardt, of Munich, in the first story of the south tower, will be proceeded with. The new clock will strike the hours and quarters on the large old bells hung in the belfry, as well as on the smaller bells in the interior of the cathedral, and will indicate the time on two large dials fixed in the ante-temple and in the church.

The plastic ornamentation of the cathedral has received an addition in 1878 by the placing of large figures with baldachinos and consoles in the ante-church between the western towers. The reliefs, as well as the small seated figures of saints in the soffits of the side entrances in the northern portal, are so far completed that they will be mounted in the course of this summer. The forty-eight pinnacles, in French limestone, for crowning the baldachinos over the large figures at the columns of the nave, left unexecuted in the Middle Ages, have likewise been taken in hand, and they are now being placed.

The work of raising the new bells of the cathedral was carried out, without the least accident, in the time from the 13th of July to the 7th of August, 1878. The "Emperor" Bell (described in the *Builder* of June 5, 1875), weighing 27 tons (not 25 tons, as previously stated), was placed in position in the new iron belfry, 180 ft. above the cathedral floor, on the 7th of August. The stability of the new belfry was amply demonstrated in a series of trials, transmission of percussions being perceptible neither upon the iron beams of the substructure nor the outer walls of the south tower. The five cathedral bells, weighing together about 50 tons, sent forth their joyous peal again, for the first time since the taking down of the old wooden belfry, on the occasion of the unveiling of the statue of King Friedrich Wilhelm III., on September 26, 1878 (see the *Builder* of May 31, 1879).

Besides the execution of the stonework for the spires and the gigantic finials, the completion at an early date of the towers depends principally upon the erection of the last three stages of the scaffolding. The latter elaborate structures, placed at a height of nearly 500 ft. above the pavement, and consequently subjected to the pressure of the wind to an increased degree, must be of an exceptionally careful and solid construction and execution. As the erection of scaffolding at such heights can be proceeded with, as we know from experience, only in fine and perfectly calm weather, the summer months from March to September can alone be safely employed in such works. The difficult task, therefore, of completing the fifth and six stages of the scaffolding will take up this summer, while for 1880, after the erection of the seventh and eighth stages, is reserved the placing of the tops of the spires.

M. Favre, the contractor for the St. Gothard tunnel, died on Saturday last (according to a Berne telegram), of apoplexy of the heart.

A CURIOUS TOMB IN HAMPSTEAD.

IN the south-east corner of the parish churchyard of Hampstead, in the north of London, stands a large family mausoleum, to which a singular history is attached. It appears that some seventy or eighty years ago, when the district of Pimlico was little more than an open field, there lived in it a certain Mr. Henry Lewer, who was largely connected with some mercantile house in the City, and was equally wealthy and respected. He was also a man of taste, and one whose commercial instincts and habits taught him to look forward with a discerning eye to the future.

It is recorded in the annals of Hampstead that one fine summer afternoon, many years before his death, this Mr. Lewer took a long walk from Pimlico, through Marylebone-fields and St. John's Wood, up to Hampstead, and sat himself down to rest on a tombstone under one of the yew-trees in the churchyard, and that whilst there he was so struck with the beauty of the spot and the fineness of the view, embracing as it did, and still does, the whole panorama of the Surrey Hills from Caterham to Guildford, that he resolved, if he could not become a resident of Hampstead in his lifetime he would make it his last resting-place when dead. Accordingly, having feasted his eyes with the beauty of the spot until the sun began to set, he went home, sent for his solicitor, and made his will. In this he declared his desire, wherever he should die, to be buried in no other place but Hampstead, and in one particular corner of the churchyard. He also immediately arranged for the purchase of a square plot of ground, on which he placed a mausoleum which he erected for himself and his family, and there and then appointed a body of trustees to carry out his desire, and to see that his tomb was kept up and carefully repaired from time to time, settling the interest of a sum in the public funds by way of an endowment for it.

The mausoleum is a heavy square structure of Portland stone, very massive and very plain, utterly devoid of ornament, and as prosaic as can well be imagined. It consists of three tiers of solid masonry, rising one above another, and bearing inscriptions on their sides. There is not a "holy text" nor a pious verse, nor an emblem of hope or of immortality,—or of mortality either. All is plain business and matter-of-fact; a type, doubtless, of the mind of the founder. Along the upper face runs the following legend:—"This tomb and vault was built by Henry Lewer, esq., of Pimlico, as a place of rest for the mortal remains of himself and as many of his family as it will contain, till it should please Almighty God to call them to life immortal. The whole is endowed and provided for in trust in the Three per Cent. Reduced Annuities, the 2nd of May, 1817. The two eldest of the family, with the rector of the parish, are the trustees. See the Parish Registers."

In front of the lower stage or compartment, again we read:—"Sacred to Posterity: Henry Lower, esq., the founder, died the 19th of April, 1819, aged sixty-seven." Then follow the names of five of the founder's sons, and also of several grandsons, together with their wives; the whole amounting to about twelve entries. Along with them, the inscription records the death of a faithful servant of the Lewer family, Maria Coulland, housekeeper to the third son of the founder. And on the south side of the monument there is a notice of the death of Mr. William Lewer, of the parish of St. George, Hanover-square, who died in 1798; and of Anne, his widow, who died in 1812. These were probably the parents of the founder.

The last member of the Lewers, who died at Hamburg three years ago, was brought over to be buried here. His name is thus recorded on the mausoleum:—"Edward North Lewer, fifth son of the founder, died May 7, 1876, aged eighty." On the occasion of this gentleman's interment there was a funeral dinner at one of the principal taverns in Hampstead, the "William the Fourth," at which the only two survivors of the Lewers, and about a dozen of their friends sat down to a pleasant and substantial repast. There were no tears or sobs or wailings for the departed; but, if the truth must be told, there was much pleasant and agreeable conversation; and a song or two were sung, if we are not mistaken, by the old parish clerk, who had officiated at the funerals of all the Lewers in succession. It appears that this dinner is provided for in the written instructions of the founder, and that it is regularly paid for out of the endowment in the "Three per Cent. Annuities," above mentioned. The dinner bill, with the little etceteras of wine and dessert, amounted to just 20*l*.

The mausoleum since that date has been once more cleaned up and furbished; and when the last two Lewers are dead and consigned to its care, the vault will be closed, and the "trust" will be declared at an end. Meantime the grave has been fenced in with wire, and planted round with cypresses and other evergreens and shrubs, which, it is said, were sent over from Hamburg for that special purpose.

WELL WALK, HAMPSTEAD.

THIS interesting spot, which has recently suffered severely at the hands of the trustees of the Wells Charity, is about to be still further despoiled. It is proposed to pull down the old Assembly-room, now the head quarters of the 3rd Middlesex Volunteers, and the interesting house adjoining, and to form a new road out of the east side of Well-walk.

The Assembly-room is built upon a portion of the waste land lying about and encompassing the Wells, which was granted in 1698 by the Hon. Susanna Noel, relict of the Hon. Baptist Noel, and mother of Baptist, Earl of Gainsborough, in trust for the poor of the parish of Hampstead. The charity apprentices poor children; the income in 1812 was 92*l*. per annum, and the trustees had at that time a sum of 1,100*l*. in the Three per Cents. The Assembly-room was converted into a chapel about the year 1733, according to Mr. Wm. Howitt, in his "Northern Heights of London." The same author says "There is a charming little grove in Well-walk, with a bench at the end, whereon I last saw poor Keats, the sun setting, sobbing his dying breath into a pocket-handkerchief, glancing parting looks towards the quiet landscape he had loved so well." Leigh Hunt, too, in his autobiography, mentions Well-walk in connexion with Keats, of whom he relates, "As we were sitting on the bench, in Well-walk, near the Heath,—the one against the wall,—he told me with unaccustomed tears in his eyes, that his heart was breaking. Then, and till his death, he believed that the Reviewers had destroyed his fame."

Keats's seat has been preserved, but the appearance of the Walk has been already greatly changed, as may be seen by comparing its present aspect with the engraving from a photograph taken expressly for the work in "Howitt's Northern Heights," page 54. What will be its appearance when the improvements in contemplation are carried out, and the Walk is filled with neat stuccoed villas, it is impossible to say, but few people will probably be able to realise that it was here that Keats put into words his incomparable "Ode to the Nightingale."

THE DRAINAGE OF MUNICH.

At a recent meeting, specially convened, of the Town Council of Munich, the subject of the construction of the necessary drainage works for the Bavarian capital, which have become imperatively necessary, was brought forward for discussion. It should be remarked that, like all sanitary reforms involving increased local taxation, the execution of a scheme for draining the city has hitherto met with considerable opposition from more than one quarter. The reporter, Bürgermeister Dr. Erhardt, in introducing the subject, made some very sensible and practical observations. He dwelt on the extremely important aspect of the question with regard to the cleanliness and health of the town, as well as on the financial sacrifices that would have to be made to secure improvement in that respect. England, he pointed out, preferred the removal of sewage by flushing. This example had been followed by many towns of Germany; the city of Munich entertaining the plan of canalisation as early as 1874. When the Bavarian capital was visited by cholera, in 1872, it was acknowledged that sanitary measures of a radical nature must be adopted. The health of the population was the main point, the questions of expense and of farming being secondary matters. The scheme of Mr. Gordon, C.E., of Frankfurt on the Main, which advocates the removal of the sewage by flushing, combined with irrigation works, was not approved of by the Munich Medical Association. It was true

that the expenses would be heavy. But what had been accepted in practical England, in Paris, Liège, and many large towns of Germany, showed that the drains of a town ought to be so constructed as to serve for the removal of the sewage by flushing. Although Munich was better in reality than by repute, it was not one of the healthiest towns. It would be disastrous to wait for the Philosophers' Stone to drop from heaven. The plague, after the lapse of centuries, was again knocking at the gates of Europe. Let this be a warning to do everything possible from a sanitary point of view. Dr. Erhardt finally earnestly recommended the acceptance of Mr. Gordon's scheme. In the discussion which followed it was asked whether another, less expensive, mode of carrying off the sewage could not be suggested. Other matters, quite as pressing, required attention, and the execution of the project would raise the municipal rates to double their present amount. Practical men considered the irrigation question not yet ripe for discussion, and it would be unwise to attempt the solution of a problem the cost of which could not be foreseen. Another speaker pleaded energetically for Mr. Gordon's project; while a third advocated the drainage scheme, with the retention of the cesspool system. The city was as healthy as any other, and sewage works cost enormous sums. In replying to these and similar objections, Dr. Erhardt pointed out especially that drains of some sort must be constructed; the matter was too urgent, and could not be postponed much longer. Authorities had pronounced for it. The speaker said he would be perfectly satisfied if he succeeded in reducing the mortality by drainage by only three per cent., although it would be impossible to banish typhus and cholera altogether. He mentioned the case of Hamburg, where before the drainage the death-rate by typhus was 49 per 1,000, while since the completion of the canalisation of the city it had fallen to 29 per 1,000. The Society of Architects and Engineers had estimated the cost of construction at 2,000,000*l.*, Herr Baurath at only a fourth that sum. Such men as Dr. Betz spoke strongly against the objections frequently raised against drainage works, urging that sewage gases or sewage itself could have no deleterious or noxious influence either upon the atmosphere or the soil. The fact was the Association had made up their minds on Mr. Gordon's project before it was even published by that engineer. On the whole, the opinion of a single expert knowing the subject well was the best. If, for financial reasons, nothing was done now, everything would have to be done shortly and all at once. After an animated debate, extending over three hours, the council resolved, by a majority of nineteen votes against eight, not to postpone the matter, but to discuss the details of Mr. Gordon's scheme at their next meeting. A very wise resolution, and one, we trust, that will bear fruit.

PRESERVING WALL PAINTINGS AT CANTERBURY.

SOME very interesting wall paintings in the dining-hall of the Kingsbridge Hospital, the resting-place of the poorer pilgrims to Canterbury, have just been brought to light. When the whitewash was being cleared off from the walls, fragments of paintings representing the murder of Becket were found on the north end wall. The huge fireplace which had been built against this wall was thereupon removed. This laid bare paintings of rare beauty, containing in the central portion a vesica enclosing a life-size picture of our Saviour seated upon a throne. The emblems of the four evangelists surround the vesica, each enclosed in a circle. A great part of St. Luke had been cut away to allow the flue to pass through the wall. All the other parts are in good preservation. Immediately beneath the vesica is another painting about 4 ft. high,—our Saviour and the Apostles at the Supper; Jesus giving the sop to Judas. The before-mentioned painting of Becket's Murder is on the eastern side of the central subject, and is of a later date than the very fine work it adjoins, and inferior to it in execution. On the western side was a painting, now much destroyed, apparently showing Henry II. doing penance at the shrine of Becket.

In the reign of James I. a coat of distemper ⅛ in. thick, was put over the whole of the wall. The royal arms were painted over the early paintings, and above those arms the arms of George Abbott, archbishop from 1611 to 1633, appear enclosed in scrollwork. The greater part of the royal arms fell off when the chimney was taken down. The archbishop's arms will be retained, so as to supply to those who know the tale a piquant bit of gossip in years to come. The story of the varying fortunes of the thirteenth-century building in which these examples of ancient English art have been so strangely preserved is a longish one, not to be told effectively without references to kindred foundations of Mediæval date in other places of pilgrimage. A little disquisition of that sort should be a pleasant task for Mr. James Neale, F.S.A., the architect engaged in restoring the building to its ancient condition.

The method pursued for the preservation of the paintings has been somewhat hazardous, but extremely successful as far as can yet be seen. The wall is of chalk, roughly plastered over. Upon this rough plaster is a thin coating, about ¼ in. thick, of finer plaster, and upon this the subjects are painted. What was once rough plaster next to the chalk wall was, when examined, found to be loose sand, only held in its place by the hard skin of plaster under the painting, and not held in anywhere by that, for holes had been made in the surface, and the sand ran out through them. Boards were placed against the painting and the sand encouraged to run out by gentle tapping. Copper and slate dowels were then let into the wall in a number of positions under the larger cavities. The chalk of the wall was thoroughly saturated with water driven in from a large garden syringe. Then the cavities were packed with old Portland cement, and cleansed flint road-drift, nearly in a semi-liquid state, applied in very small quantities at a time. This has solidified round the dowels, making thus the most thorough attachment to the wall in all positions. The incrustations of smoke and dirt were then attacked, spirits of wine and water, applied with a fine syringe, moistened the whole, and the coatings were taken off in small flakes. A somewhat similar process was employed by Mr. Neale in repairing the paintings in St. Gabriel's chapel in the crypt of the cathedral, placed by the Dean and Chapter under his charge. The specially interesting character of these will come into much notice shortly as a paper is to be read on the subject before the Royal Institute of British Architects next session, and the Kent Archæological Society is to publish reduced copies in their Transactions. The Society and the Dean and Chapter deserve a good word for putting copies as perfect as skill could make them, in the Cathedral library. All other custodians of perishing work should imitate the example without delay.

MESSRS. PETTY, WOOD, & CO.'S NEW WAREHOUSES, SOUTHWARK BRIDGE ROAD.

IN our present issue we give a view of the warehouses recently erected for Messrs. Petty, Wood, & Co., and already fully described in our pages.* We repeat briefly a few of the particulars. The principal front is 138 ft. in length, and the height from the pavement to the parapet is 64 ft. In the rear of the main building there are a boiler-house, with two large Cornish boilers; an engine-house, accommodating a compact high-pressure engine of 40-horse power, nominal; and a chimney-shaft, about 110 ft. in height. A principal feature in the façade is a rectangular tower, of about 130 ft. in height to the apex. Adjoining the tower, at the south end of the frontage, a wagon-way is formed, closed by folding-shutter work, 25 ft. high by 15 ft. wide. The elevation is in red brick, with dressings of Tisbury stone. Pether's bricks are used for relief in the arches over the window-heads. The northern portion of the building is distinct from the business premises, although forming a feature in the general external design. It contains the manager's residence, and bedroom accommodation for about fourteen clerks. The ground-floor has two large sale-rooms, one 67 ft. by 50 ft., the other 57 ft. by 40 ft.; a clerk's office, 33 ft. by 26 ft.; a principals' or consulting room, 18 ft. square, with lavatory, &c. Adjoining the principals' room are two strong-rooms, with hollow walls, iron-bound, the recesses filled with sand. These rooms are over-arched with brick and concrete. The first, second, and third floors are devoted almost entirely to warehouses, and the fourth to the confectionery manufacturing department, which has waterproof floors, and a kitchen, 42 ft. by 40 ft.

The works have been executed by Mr. G. S. Pritchard, and Messrs. Roumieu & Aitchison were the architects.

* See p. 681, *ante*.

THE BARONESS BURDETT COUTTS'S DRINKING FOUNTAIN AT BETHNAL GREEN.

IT transpired at the meeting of the Bethnal-green Vestry last week that the Baroness Burdett Coutts is willing to erect a drinking-fountain in the district. A report from the Works Committee stated that Mr. Lee, architect, had laid before them plans of the drinking-fountain which they proposed to have erected on the triangular piece of ground at the junction of Baroness and Hackney roads. It was pointed out at the meeting that the space has been a receptacle for rubbish, and is also used for open-air gatherings and preaching. The committee recommended that the offer be accepted, and the recommendation was adopted.

THE FOUNTAIN AT THE TOWN-HALL, VIENNA.

RAPHAEL DONNER, the "Austrian Phidias," as he has been called, was appreciated only after his death (it occurred in 1741, at Vienna). He died in poverty, and his admirable works seemed to sink into oblivion with him, until a more grateful generation endeavoured to rescue them from the limbo of forgetfulness, and to honour him as he deserved to have been honoured in his lifetime. This labour of resuscitation has not yet been completed; every now and then works of the master hitherto unknown are discovered, and it will be easily understood that great efforts are being made to bring to light everything that the sculptor of the exquisite fountain in the Neue Markt (New Market) of Vienna has produced. An excellent production, to which little regard has yet been paid, and which is itself sufficient to give him a reputation, is the fountain (of which we publish an illustration) in the court of the Rathhaus of Vienna, Wipplinger Strasse. The composition represents "Andromeda and Perseus." It is executed in soft metal, and has a height of 8 ft. 4 in. and a width of 5 ft.

WROUGHT-IRON GATES, LEATHERSELLERS' HALL, LONDON.

THESE gates were manufactured by Messrs. Gardner, at their works, 112, St. Martin's-lane, under the direction of Messrs. Wilson & Aldwinckle, the architects and surveyors to the Company.

They are 13 ft. 3 in. high, and 6 ft. 6 in. wide. The special feature in them is that they are entirely hand-wrought, without the use of castings, or aid of machinery, or any mechanical appliance whatever. To give some idea of the amount of work entailed in their manufacture it will suffice to say that there are 360 welds in them, over 500 pieces, and more than 600 rivets and bolts. The design is Elizabethan.

The grille includes a fine specimen of *repoussé* work in iron. The arms of the guild and of the City, introduced in the panels of the gates, as well as the foliage, were also hammered up from flat sheets of iron. The cypher of the Company, "L.C.," is introduced below the arms. In the middle rail is the motto of the Company "*Soli Deo Honor et Gloria*."

The gates and grille are backed with plate glass, which is separately hinged, so as to be easily cleaned. The Hall is in St. Helen's Place.

THE READING NEW TOWN HALL.

THE preliminary work, preparatory to the erection of the new Town-hall and public library at Reading, has been entered upon. The funds collected, amounting to nearly 20,000*l.*, are to be handed over to the building committee, and another 10,000*l.* the Town Council have made themselves responsible for. About 44,000*l.* will be required, including an additional sum for the erection of a laboratory in connexion with the School of Science.

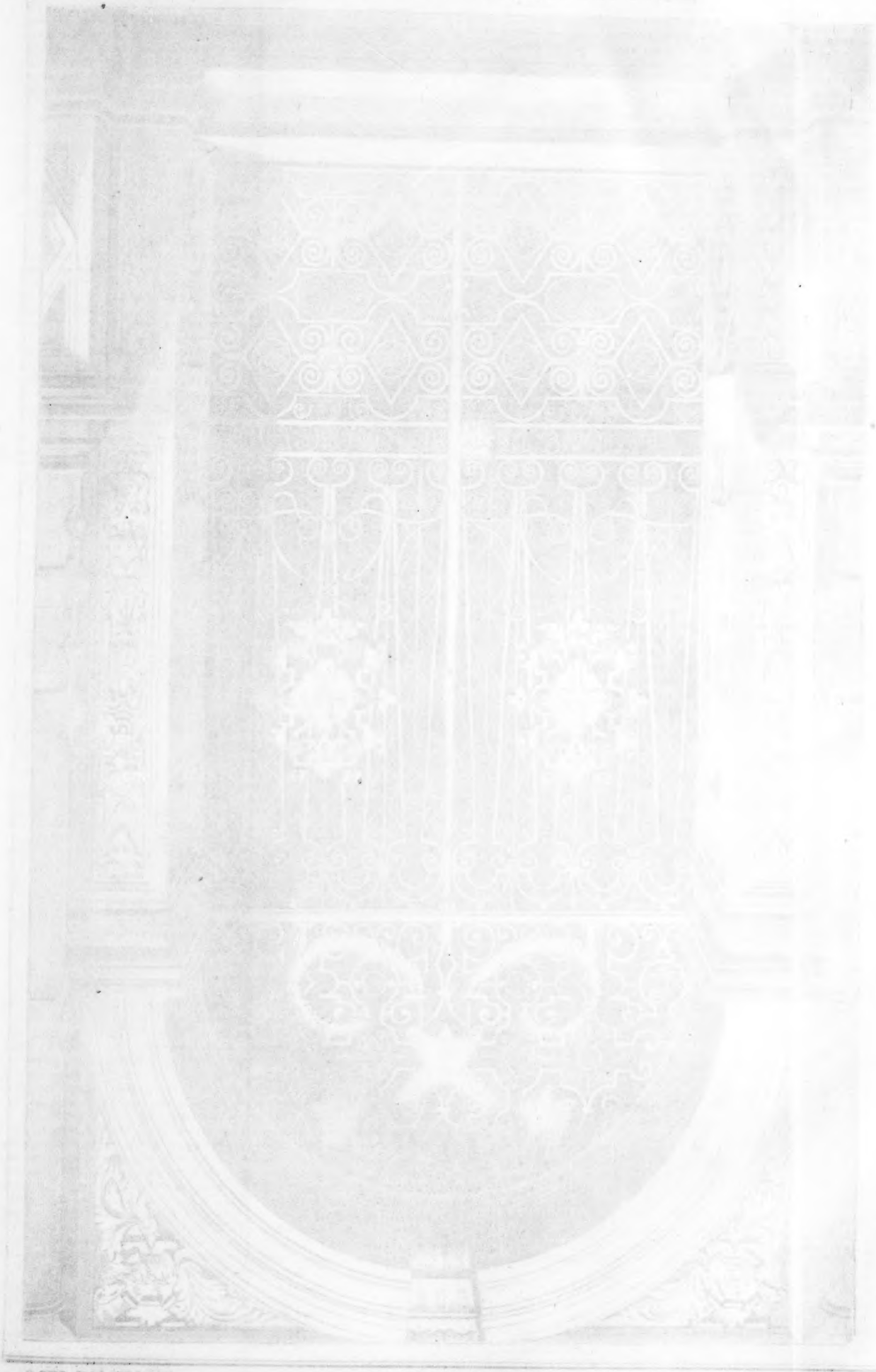
The execution of the works has been entrusted to Mr. Chappell, and on Monday the contract was signed.

THE FOUNTAIN AT THE TOWN HALL, VIENNA.—RAPHAEL DONNER, SCULPTOR.

Printed by Wyman & Sons, Great Queen St. W.C.

MESSRS. PETTY, WOOD, & CO.'S NEW WAREHOUSES IN SOUTHWARK BRIDGE ROAD.—— THE LATE MR. R. L. ROUMIEU, AND MESSRS. ROUMIEU & AITCHISON, ARCHITECTS.

WROUGHT-IRON GATES, LEATHERSELLERS' HALL, LONDON.



EVIDENCE OF A WITNESS (UNCALLED) IN THE MATTER OF LONDON BRIDGE.

"I assure you there is very excellent service committed at the pridge."—*Capt. Fluellen.*

If we may judge by the remarkable differences which are frequently observable between a speech which we have heard from even a practised speaker and a report of it which has had the benefit of his revision, it is not only the unpractised who, after they sit down, are disturbed by reflections that something was uttered that had better have been suppressed, much was but indifferently expressed, and oh! how many opportunities lost of happy allusion and effective points. The miseries of a witness at the close of an examination deserve still more tender commiseration, as he bethinks himself how easily he might have exposed the deliberate misrepresentations of his replies, and turned the tables on his tormentor by pungent repartee. There is, therefore, much to comfort a witness who has been so confident of his mastery of a subject as to anticipate with some interest an opportunity of helping on a desirable movement by something more than a mere declaration of his opinion, when he finds that what he has most at heart is so powerfully supported by others that his assistance is dispensed with. And then it is always open to him to say his say in some other form, and even to put it before a wider world through a more public channel. The Committee of the Lords on the Bill respecting the widening of London Bridge sat privately; but the matter is one of public discussion as well as public interest, and the project which was before it on its trial,—the model which I had almost called the *corpus delicti*,—is too well known, and so far is public property for public comment.

On the question how to widen London Bridge, a previous question has been moved, seconded, and supported by very high authorities,—Is there any necessity for such widening at all? At present, the bridge accommodates two lines of rapid and two lines of slow rolling traffic, in addition to the footways on either side. The footways are, doubtless, sometimes inconveniently crowded, especially on the eastern side, for about fifteen minutes at a time after the arrival of heavy trains at the London Bridge Station, with passengers to whom any progress on foot must be tedious after movement through space at the rate of fifty miles an hour. But even so, all traverse the bridge, and reach the further extremity at most only three minutes later than if it were quite free. There is no difficulty at this point that deserves serious consideration; the men of business may well endure one crumpled roseleaf here, for there are many more and more uncomfortable for them to encounter on the footways of Fenchurch-street, Gracechurch-street, and the alleys about St. Michael's of Cornhill. As regards the traffic on wheels, the case as stated for the sufficiency of the bridge seems to stand thus. Apart from enforced stoppage, all the traffic that is required to pass over the bridge can pass over it, following on in continuous stream, without delay; no train of vehicles, quick or slow, need be kept waiting; but the contingencies of stoppage by cross traffic at the approaches are very serious indeed. Setting aside such accidents as fall of horses,—here the complainants must open the question of paving and scavenging,—the grievance of a block is even more frequent in the thoroughfares of the City elsewhere than near the bridge. It must be so of necessity when heavy vehicles have to slowly cross streets at a right angle, or to cross from one side to another, and even to draw up for required delivery of their freights.

Now the width of London Bridge is not in fault if the progress of vehicles over it is stopped for a time, as in any case it must be, by similar and inevitable causes,—inevitable and to a certain degree, in any case, irremediable causes. To take the most favourable instance, a heavy wagon will pass from the approach, direct to the near side of the bridge, and will leave the bridge again by a turning on the near side,—let us say, will come down Gracechurch-street, cross over on the eastern side, and turn eastward for Tooley-street. Even by this simplest course it has to cross, and crossing it impedes the traffic of Cornhill, Leadenhall-street, Lombard-street and Fenchurch-street, Cannon-street and Eastcheap; and not only so far as this traffic passes east or west, but as, quite within its right, however embarrassingly, it turns sharp round corners to go north or south, the more traffic the bridge invites the worse will this intermediate interruption be. But it will be quite as frequent a case that the course of our beer-laden dray will not be, cannot be, so simple; and let a bridge be as wide as it may, that traffic which comes upon it on one side will be bound to quit it to proceed in the reverse direction, and thus at one end or the other must cross the direct axis of the bridge, and be unwelcome to all that travels or is on the way to travel along it. No increase of width for parallel lines of traffic upon the bridge will get over this difficulty after quitting it; the discharging lines of traffic must become a network,—network for which even Dr. Johnson's definition is too simple,—"anything reticulated or decussated with interstices between the intersections." Eastcheap, Gracechurch-street, and King William-street and Cannon-street, are interchanging traffic quick and slow with each other, independently of the bridge altogether; and the traffic to and from the bridge is passing directly and transversely to and from the single point where the bridge has its last abutment. If the four lines of traffic were increased to six, there would be a still more complex problem for the police, who perform their present duties with difficulty, but marvellous efficiency, to unplait a still more complex interlacement,—to unplait and replait it, for even this is what the case demands.

We seem, then, to be thrown in the first instance, upon the possible resource of widening the approaches. The passage of the bridge is in much the same position as the exit from a theatre on a tempestuous night, or from a crowded church or chapel on a fine day; only that in these latter examples all would be well if those who are once clear of the passages *would* move on,—would not dawdle with umbrellas, wait till cabs came to them spontaneously, or stand in groups and gossip,—whereas, in the case of the bridge, we have to desire that the external obstructions *could* move on. There is too much reason to believe that the widening of the approaches, at even one end of the bridge, is out of the question. It might not have been so twenty years ago; but at present, from the value of the businesses, leases and ground, it would be an affair of millions. As our own space here has a certain value, we cannot occupy more of it by setting forth in detail how if even that were possible which is not, it would still be ineffectual. The pressure which stimulates the clamour for a widening,—whether a widening of the bridge or of the approaches, is however all the same, a serious reality; the distress of the patient is manifest,—manifest even by his very ignorant demonstrations of impatience;—and if his constitution will not bear the loss of blood, if he cannot with safety be called upon to suffer an excessively copious bleeding financially,—an heroic remedy of another kind is to be thought of.

The surgical analogy suggests, not inaptly, the capital operation of John Hunter for the relief of a threatened fatal widening (*aneurismus*) of the popliteal artery. He boldly relieved the oppression of the main channel of communication, by not enlarging the channel, but reducing the inflow at the threatened point, and dispersing it,—in fact, by constriction; and he was justified in his expectation that the obstructed current would find its way round by other ducts. What seems to be required, in short, is another roadway across the Thames, below London Bridge, which would convey a vast amount of traffic directly across which now has to concentrate upon a single point only to be again dispersed, and in its dispersion, as in its concentration, to be at once obstructive and obstructed. There are men of unquestionable skill and experience who pledge themselves that an iron bridge of a single span, and 100 ft. high at least, may be constructed at some point about Wapping, under excellent conditions of access, and as regards finance, with a certainty that the result would be as lucrative as the improved approaches to London Bridge have turned out to the City. Until this project has had full justice done to it it would be premature to discuss others; and as to any other projects which can be brought forward, I relieve my own mind at least when I declare my conviction that what plans have hitherto been mooted of widening either London Bridge or its approaches are not merely premature, but preposterous.

When considerations as to practicability of plans have been duly weighed and fairly appreciated, and such a conclusion arrived at, it may seem superfluous to deal with that one of them which was promoted by the City on grounds of so flimsy a texture, as compared with the economical, as æsthetic sentiment. This may or may not be so; but it would be illiberal and unfair to assume that any wealthy and presumably enlightened corporation is indisposed to assign value to the graces in comparison with the grossnesses of life,—that they will not sympathise up to a certain point with a hero who also was a burgher, in the sentiment,—

> "Life, life, my friend,
> May bear a not unornamental course
> Wherever it may flow; it was not meant
> By him that on the back the burden bound,
> That cares, though public, critics', and grave,
> Should so incase us and incrust as shuts
> The gate on all that's beautiful below.
> This was not meant,—and me may not befal."

—May not befal London, so long as St. Paul's remains on London's highest ground, and is a symbol visible to all eyes as London is approached, of aspirations at least which embellish and dignify the most honourable success in the hive of industry to which it is central. The city of London may boast of two structures which are worthy of all that such a metropolis may aspire to be,—St. Paul's Cathedral and London Bridge; and the later of these, as dating in what some of the older of us will not relinquish our right to refer to as our own time, has even peculiar claims to our proud regard. A proposal to destroy London Bridge,—destroyed it may be as effectually by disfigurement as by pulling it down,—for the convenience of wharf or warehouse, or railway station, can scarcely be less repugnant than a suggestion that St. Paul's obstructs the access to Cheapside, and that regrets for its demolition may be easily soothed by calculation of the price per square foot which would be realised for its site at the Auction Mart.

London Bridge is remarkable as a solution of that problem which is ever held up as the test of genius in constructive art, the reconciliation of engineering skill with beauty in result. And the beauty which is thus signally realised is of an elevated class; it is on a level with the demands of the occasion. It has often been compared, in the general character of the sweep of its arches, with the Ponte della Trinità at Florence, one of the very few bridges of Europe that deserve to be mentioned with it on the same page. This bridge also is beautiful in itself, and has the further merit, like London Bridge, of being distinguished by a beauty which is in harmony with the city that it adorns, and the river that it spans. But it need not be said that the characteristic beauty is different. The bridge over the larger and broader and busier Thames, is appropriately massive, majestic, simple in adornment, large in its parts; it is expressive of power in the composure of perfect rest, sustaining and subserving the daily transit of a population that, in so many respects, stands alone and unrivalled in the world, or, if we should be modest, let us say that hopes and intends to do so. It has an imposing air of refined sobriety,—it is dignified, noble. This result was certainly achieved by a true artistic sense of the proportions which were appropriate to the occasion, in span and height of arches, elevation and outline of piers, in gradation of magnitudes among voussoirs and masonry generally. Ornament, as ornament, is eschewed, in deference to the predominant serviceable; and yet is the serviceable so treated as to convey a recognition of refined finish, which affects us with precisely that feeling of agreeableness which is required to temper severity and enliven utility.

It is, perhaps, not worth while to lay much stress on the possible injury to the bridge, æsthetically, by a considerable extension of width, as presented to passengers passing over it. At the same time, the possibility is not to be set aside as futile, though it need not be insisted upon as cancelling material advantages on the other side, supposing such to exist. An exaggeration of breadth, relatively to length, is a change that must always be perilous when there is no objection to be taken to existing proportions. A more serious and decided jeopardy for beauty would be involved by a change which should make such an addition to the arches, up and down stream, as to give them the look less of arches proper than of sections of tunnels. This effect would be liable to ensue if one change were made, that on its own ground, stands high in the competition of undesirables,—if the bridge were widened by an extension in granite like the present, upon exactly the same design. It may be presumed that the engineers would not reject this plan as too difficult for

them to execute with safety and success. But assuredly the bridge, as seen by the multitudes from the river, and from the quays on any view, and on an oblique view especially, would be the same bridge no longer. The space below the arch would be darkened, the impression of its loftiness would be reduced, and the view clear through would be lost from many of the best points of view. However, the interest of this discussion is happily now only theoretical, and we are at liberty to pass on.

A very different proposal, which found its way through the Parliamentary defiles without molestation as far as the verge of the final reading in the Lord's House, had for its basis an extension of the roadway with no change in the foundations, by what were best described by a Germanism as an *On-hang* of iron. This scheme was not only embodied more or less distinctly in the Bill, now happily defunct, but visibly in a good-sized model, which gave it all fair play; in which it presented itself with that self-confidence which is equivalent to self-praise, and in this case had the proverbial fate of self-praise, of being no recommendation. By this scheme masonry was superimposed upon the projections of the piers, forming abutment for the spring of an iron arch at some distance above the granite arch, and not corresponding with it in line of sweep; this framed beam showed as carrying a partially overhanging footway above, with a light open balustrade. Engineers had differences of opinion as to the judiciousness of the weight of this iron being thrown precisely where it would exert its downpress, and also as to the chances of amicable behaviour of stone and metal as exhibited, and under contrasted liabilities to expansion and contraction at the points of attachment generally. But this is a discussion that is apart. We have chosen to concern overselves here with a question of æsthetics, with an argument which assumes that the interests of beauty are for the time at least the predominant,—the supreme interests. And assuredly these are very seriously at stake when a structure of stone, which is of allowed and unimpeachable beauty as it stands, is threatened with a metallic addition in closest association.

We understand how lively is the appreciation of such danger by palliations that have been suggested, adventurously or in desperation, by some who had not the unkindest feeling towards the scheme on its merits. One of these, which the English language was called upon to lend itself to expressing, was that the iron might be skilfully painted to simulate granite; and another that the incongruousness of the combination might be masked by the iron receiving such superficial extension as to hide the stone entirely.

The scheme is dead and gone, thanks to "care and valour" which hail like Captain Fluellen from the principality; in fact, to the vigilance and energy of Lord Carnarvon; it is gone beyond chance of revival, thanks to the unanimity of a committee which certainly did not decide without giving attention to a cloud of witnesses; but it is well that some notes should be made of the considerations at issue, even while we are still under the agitation of a narrow escape.

Such things have been, it may be conceded, as additions in a new style being made to earlier buildings, and the world being satisfied to abide by and even rejoice in the change. We would not willingly spare the porches which at Peterborough are set even unconformably in front of a cathedral of contrasted style. But as these porches are to the cathedral behind, such assuredly was not the proposed iron addition to the magnificent structure which it was proposed to be stuck on to. We are far less satisfied with the Perpendicular lining which conceals the Norman choir of Gloucester Cathedral,—but even here the intrusion is still of stone upon stone; while at Winchester the alterations were managed with such art and skill, that the new work happily blended with the old and the result was an improvement.

It were hard to say that iron construction can under no circumstances whatever be harmoniously combined with stone; no other principle is involved in such a union abstractedly than we see consistent with the association of stone and brick; but approval of such association waits upon success. In what precise manner architectural genius will achieve this, it is not for me to divine, nor on the present occasion even to conjecture. In any case, it will certainly be found that such harmony only consists with one or other material being decidedly subordinated, not, as in the luckless model, in both being committed to direct antagonism, each exhibited as subserving precisely the same functions as if in ostentatious rivalry. Even so the most artistic skill will be required to make it evident that while each material is restricted to its special and appropriate office, there is still a definite sympathy between them. Let me without offence illustrate this by the example of Westminster Bridge. Here the predominance is given unequivocally to the material iron, and stone is employed only for the piers; the laws of subordination and propriety are so far duly observed; but I own to a certain sense of discordance between the piers and the arches, which is not of necessity; it is not due to colour alone, though this is somewhat and is unfortunate when colour in stone is at choice; but it is even more in treatment of form and surface that I miss such a relation as would conduce to easy transition,—would, in fact, take advantage of contrast as music of a discord, by including in it a preparation for a heightened concord to ensue.

This may serve as an example of the problem that architecture must solve if ever the association of iron and stone is to be other than Mezentian,—a union of the living and the dead, a mongrel or a monstrous abomination, such an attachment as that by which Byron translates Horace's illustration of an incongruity in art,—

"A maid of honour with a mermaid's tail."

Sooth to say, the design put forward did make a certain attempt to fuse and incorporate the unnaturally connected systems; but it was by interference with the broader features of the piers, by frittering divisions and by objectionable ornaments, that painfully suggested the treatment of the railway bridge across Ludgate-hill; treatment which we were promised would reconcile us to the ruin of the grand approach to St. Paul's.

However, the scheme is no more, and we can afford to part with the subject in good humour. Even its advocates may have got over their disappointment at the last moment, and now may join in a smile at the importance which was ascribed to a chance of getting rid of the annoyance of dust on the bridge by an open balustrade. One witness,—though this, indeed, was not included in evidence,—expressed his surprise at the inconvenience being even detected, as from what he had seen of a recent report of civic festivities, the citizens seemed to him either quite unconscious when dust was being thrown in their eyes, or even to like it; while another, who professed to think that the dust settled the question, assuredly only did so in order to drag in his quotation,—

"Hi motus animorum, atque hæc certamina tanta,
Pulveris exigui jactu compressa quiescent."

W. WATKISS LLOYD.

ADVICE TO YOUNG ENGINEERS.

ENGINEERS' CLUB OF PHILADELPHIA.

THE President of this Society, Mr. Thos. C. Clarke, took for the subject of his last address the "Future of American Engineering," and made some statements, and gave some advice, which, as they are just as pertinent here as there, we have pleasure in printing:—

The numbers of our profession are increased every year by hundreds of graduates from the technical and scientific schools, and by others who rise from the ranks of the great army of labour to become its leaders. All of them expect to make engineering, in some of its various branches, the profession and occupation of their lives; and all are interested to know whether there will be room and work for all. One's first demand of his profession is that it shall give him an honest living. His next strongest wish is to find an opportunity to execute some work that shall fully call out his abilities, and give him some measure of that fame which we all prize. Finally, he ought to wish to "pay the debt which every man owes to his profession" by making some permanent addition to knowledge, either in engineering itself or in some of its kindred sciences. If a man succeeds in but one of these three things he may be thankful; if in all, he may justly claim the title of an "eminent engineer."

The broadest, and at the same time most concise definition of engineering, is "scientific construction." If this be true, engineers have existed from the days when the early kings of Egypt reared the first pyramids, a thousand years before Abraham was born, down to the generation which has seen the achievements of Stephenson, of Morse, and of Eads. But while engineers have lived and laboured for so long a time, it is only of late years that they have become a distinct guild and profession. The name was first applied to the makers of canals, aqueducts, dykes, jetties, and other hydraulic constructions. Then, it was extended to the makers of railways, and now, it takes in a much wider range of operations. It will be attempted to show that on the breadth and inclusiveness of this classification depends the solution of the problem of the future success of our profession.

The first question is,—What preparation and education will best make a man a scientific constructor? A great deal of discussion has taken place during the last year or two on the education of engineers It is not intended to enlarge upon this here. Suffice it to say, that we are all now agreed that education is of two kinds, that derived from books, and that obtained from actual practice and from contact with men. One tells us what to do, the other how to do it. Both kinds are absolutely necessary. The more of the first kind an engineer has, or, in other words, the broader and deeper the foundations of his knowledge are laid, the more readily and intelligently will he acquire the second, and the more satisfactory will be the results of his practice. But in order that his learning may be of practical use to him, he must also have experience.

The young engineer of the present day comes to his work with a much better preparation than those of the generation before him. He must not, however, make the mistake of supposing that the eminent engineers of a past generation, who never enjoyed the privileges of the schools, were deficient in scientific knowledge. They had it, but they got it from actual experiment, and went beyond the books of their day, and were in many cases the original discoverers and investigators, the fruits of whose labour every school-boy can now enjoy. The weak point of the old system was, that while it produced many great men, yet the average did not stand as high as now; and the expenditure of much capital had to be entrusted to ignorant persons, whose blunders led to enormous waste, and whose names are now happily forgotten, together with their mistakes. The young engineer of the present day should also remember that now, as in the past, there is but one road to success. He who wishes to command must first learn to obey. He must show his superior officers that he is perfectly reliable and faithful. A man who has his mind occupied with the direction of large interests appreciates fully the wisdom of the saying, "Never do yourself what you can get any one else to do for you." But this cannot be carried out unless he feels perfectly sure that his assistants will not deceive him, that they will report things exactly as they are, and will carry out his instructions to the letter. After a young man has shown that he can always be depended upon, he will soon be promoted into a higher rank, where the orders are more general and where more is left to his discretion and judgment. If to faithfulness and energy he adds good judgment, and to good judgment tact, and the power of managing and controlling men, he may rest assured that before very long he will have gained the first requisite,—material success. He will probably find that soon an opportunity will offer to carry out some work which will ensure him a measure of reputation. Finally, his early scientific training having taught him to observe facts, and draw deductions therefrom, he will probably, sooner or later, make some contribution to science. Even if not a writer, he will furnish some of the material of which books are made.

We have thus briefly traced the career of a successful engineer in the present condition of the profession, or rather in the immediate past. But it will be said: "The ranks are already too crowded. More and more men are coming in every day. Although we admit the truth of Webster's saying, 'there is always room at the top,' yet what shall *we* do who are men of only moderate abilities? We do not ask nor expect the great prizes of the profession, but we cannot help thinking that in America engineers are less esteemed and less paid than in any other civilised country of the world. Will we be better or worse off in the future? Are we going up grade or down?" These are very pertinent questions, and a true answer would be of the

highest interest. I will endeavour to give you my views, always bearing in mind the modest epitaph of the old surveyor, "His hind-sight was better than his fore-sight."

It has been previously stated that on the breadth and inclusiveness of the classification of engineers depends the solution of the problem of their future success. If we bear in mind that while an engineer is, unfortunately, not always a scientific constructor, yet a scientific constructor *must* be an engineer, we shall see how numerous are the paths open to us to follow and how soon the crowd will be relieved. Let us see how the number of these paths has increased during the last half-century.

Before the year 1828, an engineer meant a man who knew how to make canals and waterworks. But when George Stephenson created the modern railway, an engineer soon came to mean a man who could build railroads. The construction of the 85,000 miles of railroads in the United States, costing over 4,500,000,000 dollars, has naturally given employment to the largest number of engineers. After these roads were opened for use, they still continued to employ many engineers in taking care of them and operating them. Within the last dozen years, the substitution of iron for wood, first in railway bridges and viaducts, and afterwards in structures of all kinds, has developed another class of special engineers, who, being of a pushing and energetic disposition, have, perhaps, monopolised rather more than their share of public attention. The development of our mineral wealth, in which it is estimated that over 400,000,000 dollars have been invested during the last thirty years, may be seen reflected in the list of the Society of Mining Engineers, which numbers 734 members.

Then we have the engineers of the waterworks, drainage, sewerage, and of the streets and structures of our large cities. The City of Boston is now expending some 5,000,000 dollars in its improved sewerage, surpassing, in some respects, even the gigantic works of London itself. Mr. Chesbrough, city engineer of Chicago, was once introduced to one of the European engineering societies as that daring engineer who had raised a city of 300,000 people 10 ft. up in the air above its original position. Allied to the preceding class we have the sanitary engineers, specialists whose duty it is to apply scientific principles to the construction of our dwellings, too long left in the hands of ignorant plumbers and builders. Then we have the honourable body of architects, who all ought to be engineers, *i.e.*, scientific constructors; for, if they are not, so much the worse are their buildings.

The great gas companies now almost always employ men of scientific attainments as their engineers, the result of whose labours may be seen rather in the increase of dividends than in the lower price of gas. But another school of specialists is coming on whose labours will correct all this,—the electric engineers, whose skill has already enabled us to light our workshops more brilliantly and at less cost than the gas engineers have been able to do it. The future of electric engineering includes not only the vast fields of electric lighting and of the telegraph, but all means of transmitting signals and, perhaps, of power. Another class of specialists has an enormous future before it in this country,—I mean agricultural engineers, who, as a separate body, have existed for some years in England. When one considers the great savings that are capable of being made by the application of correct scientific principles and practice to farming operations, which are now done so loosely and by rule of thumb, who will not say that here is not a great opening for engineers in the near future? Then there is a class of engineers whose services are more and more in demand every year,—I mean the engineers employed by large contractors. Some of the ablest men in England are contractors' engineers.

You will observe that for a man to succeed in any of these newer branches of our profession he must be much more than a mere surveyor or designer and measurer of masonry and earthworks. He must be, first and foremost, a mechanical engineer, as it is termed. He must understand dynamics as well as statics, and must be practically familiar with the construction of machinery and machine tools. In Europe no man can attain eminence as a civil engineer who is not well versed in the mechanical part of his profession. Hence, we find them constantly called upon to design, construct, and report upon paper-mills, cotton-factories, sugar-machinery, iron and steel works and such things, which in this country are entrusted to manufacturers rather than to engineers. I do not mean to say that this country is behind others in mechanical engineering,—the names of Fritz and Griffen, of Sellers and Holly, forbid that; but I do mean to say that if the American engineers, as a class, were better versed in the mechanical part of their profession, they would not see themselves laid on the shelf by the capitalists who throw away their money on Keeley motors.

It was one of the traditions of the elder school of engineers that they should carefully abstain from taking part in matters of business. Architects and civil engineers were formerly either government officials or, as professional men, they held the same social position, which they feared would be lowered if they became business men, skilled in prices and sharp at a bargain. This was merely a survival of the old feeling of contempt which the governing classes,—the men of the sword,—felt for the men of affairs. The effect of this mischievous tradition has descended to our own day, with unhappy results to the profession. I need scarcely tell you that an engineer is only half fitted for his work unless he is able to hire men and buy materials and execute his own designs, if occasion calls for it. It may seldom be necessary for him to do it, but the ability of so doing makes him a better judge of the value of a contractor's work, and a far safer estimator of the probable cost of public works. European engineers profess to be able to do this, and this is one reason why they command their five per cent. commission on the cost of their works, and attain wealth and position, while, in this country, engineers are too often paid the salaries of second-rate clerks.

BUILDINGS FOR HARVESTING AND DRYING CORN.

THE exceptionally wet and cold seasons that of late years have sadly upset the farmers of Great Britain, and which have had a great share in bringing about its present depressed state, should have led the various agricultural clubs, in London and the counties, to have inquired if architects, engineers, and builders could not devise some plan to save corn and grass from the ruinous swampy condition such weather leads to.

A dip in the British Museum Library has disclosed some particulars of the availability of buildings, as drying barns, to ripen corn and grass, and which, when once erected, will enable agriculturists to reap and to mow, regardless of fine weather for garnering.

Amongst other reliable works which we could call attention to is Garnett's "Tours in Scotland," the author of which, as secretary to the Royal Institution of London, at the latter end of the eighteenth century, inquired, by personal travel, into the state of agriculture in the Highlands of Scotland. He visited Inverary Castle, the seat of the Argyle family, where the money laid out by successive Dukes of Argyle, from 1745 to 1800, in improving and building on the estate, amounted to 250,000*l*.

At a farm called Glen Shira, about two miles distant from the town of Inverary, the secretary to the Royal Institution came upon the duke's drying-barns, buildings found to be very useful in so wet a climate as the Highlands, for by means of these barns hay may be made or corn dried during the heaviest rains. This was not a mere experiment, but a veritable fact proved year after year.

The building in question stands across a valley, and is of circular form, so contrived as to cause a draught of air even in calm weather, there being open arches opposite to each other throughout the whole building. [After the principle, perhaps, of the drying-sheds at Vauxhall, where cakes of whiting are packed after being moulded.] The drying-barn is divided into two stories, and the upper one is used for drying; the lower one consisting of cow-houses and other conveniences. The floor of the upper story is made of small boards or battens about 1 in. distance from each other to receive the benefit of the air below. There are likewise openings in the sides of the walls at convenient heights to receive the hay and corn from the carts. On this floor the grass is laid soon after it is cut; a few hands serve to turn it over for two or three days, when it is found perfectly dry and of finer flavour than hay dried by the hot sun.

In this story are jointed frames of wood, suspended from the roof at convenient distances from each other. These frames have a number of sharp-pointed pegs on each side of them, inclining upwards, upon each of which a sheaf of corn is hung to dry.

The frames, by means of joints, are lowered down to receive the corn, and when the drying is finished they are moved up again, to be out of the way.

So fully convinced of the utility of this mode of drying was the spirited landlord, that he fitted up several small barns for that purpose on different parts of his estate. The barns have several small beams running parallel to each other across the breadth of the room; from these are suspended a great number of long poles filled with pegs, on which the sheaves of corn are hung. The corn in the West Highlands is often cut down before it is ripe, and can scarcely ever be well dried by exposure in the open fields.

Dr. Smith, in his "Agricultural Survey of Argyleshire," gives a particular description, with a plan, of these drying-barns; and as their erection cannot be of very heavy expense, there is time now to build and save the thousands of acres of corn which otherwise appear doomed for ploughing up.

Great improvements in the original drying-barns might soon be effected by the building world, aided by engineering skill; drying-fans, or even the fans used at Indian bungalows, might expedite the ripening of the harvest, under cover of suitable buildings.

Some years ago, the *Builder* brought this question of artificial drying prominently before its readers. Some time afterwards an invention for effecting it was perfected, and has been employed satisfactorily, the expense being the only objection.

THE EXCAVATIONS FOR CHILD'S NEW BANK BUILDINGS.

ANCIENT UNDERGROUND STRUCTURES.

THE prediction that in getting out the foundations for Messrs. Child's new bank buildings some structures and remains of an interesting historical character would be met with has already been verified, although the excavations at present have been carried out only to a limited extent. For the new building an area of about 15,000 superficial feet is being excavated to a depth of 18 ft. below the level of Fleet-street, and this involves the removal of about 204,000 cubic feet, consisting for the most part of massive underground brickwork. Brick walls running both east and west, and north and south, 4 ft. and 5 ft. in thickness, have been met with; and at the rear of the site under excavation, and immediately adjoining the old building—now demolished—known as "The Devil's Tavern," a wall has been found, 7 ft. in thickness. Each side of this wall consists of brick, and the central portion, which can be traced running from south to north as far as the site of Temple Bar, is of flint and chalk, leading to the suggestion that it is a portion of old London Wall. Close to this 7-ft. wall, in excavating the earthwork, a number of skulls and other human remains, including a skeleton in an almost complete state, were met with. Several of the skulls and other portions of the remains thus discovered have been preserved, and are under the care of Mr. Munday, who is superintending the excavations as foreman of the works to Messrs. G. Smith & Son, the contractors for the new building.

Perhaps the most interesting underground structures which have been met with during the progress of the works are those which have been discovered near the Fleet-street frontage, immediately under the site of the old bank buildings, and also at the east end, running from Fleet-street southwards. The first-named discovery consists of a number of Gothic arches, of fire-stone. These arches spring from octagonal piers, and are four in number, built at right angles to each other. To the east of these, and in connexion with them, on the same underground floor level, is what may be termed a vaulted corridor running in a southerly direction several yards from Fleet-street. This discovery came upon the workmen by surprise, and was unexpectedly made after they had come to what they considered the extreme depth of the cellar floor level. The vaulted

them to execute with safety and success. But assuredly the bridge, as seen by the multitudes from the river, and from the quays on any view, and on an oblique view especially, would be the same bridge no longer. The space below the arch would be darkened, the impression of its loftiness would be reduced, and the view clear through would be lost from many of the best points of view. However, the interest of this discussion is happily now only theoretical, and we are at liberty to pass on.

A very different proposal, which found its way through the Parliamentary defiles without molestation as far as the verge of the final reading in the Lord's House, had for its basis an extension of the roadway with no change in the foundations, by what were best described by a Germanism as an *On-hang* of iron. This scheme was not only embodied more or less distinctly in the Bill, now happily defunct, but visibly in a good-sized model, which gave it all fair play; in which it presented itself with that self-confidence which is equivalent to self-praise, and in this case had the proverbial fate of self-praise, of being no recommendation. By this scheme masonry was superimposed upon the projections of the piers, forming abutment for the spring of an iron arch at some distance above the granite arch, and not corresponding with it in line of sweep; this framed beam showed as carrying a partially overhanging footway above, with a light open balustrade. Engineers had differences of opinion as to the judiciousness of the weight of this iron being thrown precisely where it would exert its downpress, and also as to the chances of amicable behaviour of stone and metal as exhibited, and under contrasted liabilities to expansion and contraction at the points of attachment generally. But this is a discussion that is apart. We have chosen to concern overselves here with a question of æsthetics, with an argument which assumes that the interests of beauty are for the time at least the predominant,—the supreme interests. And assuredly these are very seriously at stake when a structure of stone, which is of allowed and unimpeachable beauty as it stands, is threatened with a metallic addition in closest association.

We understand how lively is the appreciation of such danger by palliations that have been suggested, adventurously or in desperation, by some who had not the unkindest feeling towards the scheme on its merits. One of these, which the English language was called upon to lend itself to expressing, was that the iron might be skilfully painted to simulate granite; and another that the incongruousness of the combination might be masked by the iron receiving such superficial extension as to hide the stone entirely.

The scheme is dead and gone, thanks to "care and valour" which hail like Captain Fluellen from the principality; in fact, to the vigilance and energy of Lord Carnarvon; it is gone beyond chance of revival, thanks to the unanimity of a committee which certainly did not decide without giving attention to a cloud of witnesses; but it is well that some notes should be made of the considerations at issue, even while we are still under the agitation of a narrow escape.

Such things have been, it may be conceded, as additions in a new style being made to earlier buildings, and the world being satisfied to abide by and even rejoice in the change. We would not willingly spare the porches which at Peterborough are set even unconformably in front of a cathedral of contrasted style. But as these porches are to the cathedral behind, such assuredly was not the proposed iron addition to the magnificent structure which it was proposed to be stuck on to. We are far less satisfied with the Perpendicular lining which conceals the Norman choir of Gloucester Cathedral,—but even here the intrusion is still of stone upon stone; while at Winchester the alterations were managed with such art and skill, that the new work happily blended with the old and the result was an improvement.

It were hard to say that iron construction can under no circumstances whatever be harmoniously combined with stone; no other principle is involved in such a union abstractedly than we see consistent with the association of stone and brick; but approval of such association waits upon success. In what precise manner architectural genius will achieve this, it is not for me to divine, nor on the present occasion even to conjecture. In any case, it will certainly be found that such harmony only consists with one or other material being decidedly subordinated, not, as in the luckless model, in both being committed to direct antagonism, each exhibited as subserving precisely the same functions as if in ostentatious rivalry. Even so the most artistic skill will be required to make it evident that while each material is restricted to its special and appropriate office, there is still a definite sympathy between them. Let me without offence illustrate this by the example of Westminster Bridge. Here the predominance is given unequivocally to the material iron, and stone is employed only for the piers; the laws of subordination and propriety are so far duly observed; but I own to a certain sense of discordance between the piers and the arches, which is not of necessity; it is not due to colour alone, though this is somewhat and is unfortunate when colour in stone is at choice; but it is even more in treatment of form and surface that I miss such a relation as would conduce to easy transition,—would, in fact, take advantage of contrast as music of a discord, by including in it a preparation for a heightened concord to ensue.

This may serve as an example of the problem that architecture must solve if ever the association of iron and stone is to be other than Mezentian,—a union of the living and the dead, a mongrel or a monstrous abomination, such an attachment as that by which Byron translates Horace's illustration of an incongruity in art,—

"A maid of honour with a mermaid's tail."

Sooth to say, the design put forward did make a certain attempt to fuse and incorporate the unnaturally connected systems; but it was by interference with the broader features of the piers, by frittering divisions and by objectionable ornaments, that painfully suggested the treatment of the railway bridge across Ludgate-hill; treatment which we were promised would reconcile us to the ruin of the grand approach to St. Paul's.

However, the scheme is no more, and we can afford to part with the subject in good humour. Even its advocates may have got over their disappointment at the last moment, and now may join in a smile at the importance which was ascribed to a chance of getting rid of the annoyance of dust on the bridge by an open balustrade. One witness,—though this, indeed, was not included in evidence,—expressed his surprise at the inconvenience being even detected, as from what he had seen of a recent report of civic festivities, the citizens seemed to him either quite unconscious when dust was being thrown in their eyes, or even to like it; while another, who professed to think that the dust settled the question, assuredly only did so in order to drag in his quotation,—

"Hi motus animorum, atque hæc certamina tanta,
Pulveris exigui jactu compressa quiescent."

W. WATKISS LLOYD.

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The great gas companies now almost always employ men of scientific attainments as their engineers, the result of whose labours may be seen rather in the increase of dividends than in the lower price of gas. But another school of specialists is coming on whose labours will correct all this,—the electric engineers, whose skill has already enabled us to light our workshops more brilliantly and at less cost than the gas engineers have been able to do it. The future of electric engineering includes not only the vast fields of electric lighting and of the telegraph, but all means of transmitting signals and, perhaps, of power. Another class of specialists has an enormous future before it in this country,—I mean agricultural engineers, who, as a separate body, have existed for some years in England. When one considers the great savings that are capable of being made by the application of correct scientific principles and practice to farming operations, which are now done so loosely and by rule of thumb, who will not say that here is not a great opening for engineers in the near future? Then there is a class of engineers whose services are more and more in demand every year,—I mean the engineers employed by large contractors. Some of the ablest men in England are contractors' engineers.

You will observe that for a man to succeed in any of these newer branches of our profession he must be much more than a mere surveyor or designer and measurer of masonry and earthworks. He must be, first and foremost, a mechanical engineer, as it is termed. He must understand dynamics as well as statics, and must be practically familiar with the construction of machinery and machine tools. In Europe no man can attain eminence as a civil engineer who is not well versed in the mechanical part of his profession. Hence, we find them constantly called upon to design, construct, and report upon paper-mills, cotton-factories, sugar-machinery, iron and steel works and such things, which in this country are entrusted to manufacturers rather than to engineers. I do not mean to say that this country is behind others in mechanical engineering,—the names of Fritz and Griffen, of Sellers and Holly, forbid that; but I do mean to say that if the American engineers, as a class, were better versed in the mechanical part of their profession, they would not see themselves laid on the shelf by the capitalists who throw away their money on Keeley motors.

It was one of the traditions of the elder school of engineers that they should carefully abstain from taking part in matters of business. Architects and civil engineers were formerly either government officials or, as professional men, they held the same social position, which they feared would be lowered if they became business men, skilled in prices and sharp at a bargain. This was merely a survival of the old feeling of contempt which the governing classes,—the men of the sword,—felt for the men of affairs. The effect of this mischievous tradition has descended to our own day, with unhappy results to the profession. I need scarcely tell you that an engineer is only half fitted for his work unless he is able to hire men and buy materials and execute his own designs, if occasion calls for it. It may seldom be necessary for him to do it, but the ability of so doing makes him a better judge of the value of a contractor's work, and a far safer estimator of the probable cost of public works. European engineers profess to be able to do this, and this is one reason why they command their five per cent. commission on the cost of their works, and attain wealth and position, while, in this country, engineers are too often paid the salaries of second-rate clerks.

BUILDINGS FOR HARVESTING AND DRYING CORN.

THE exceptionally wet and cold seasons that of late years have sadly upset the farmers of Great Britain, and which have had a great share in bringing about its present depressed state, should have led the various agricultural clubs, in London and the counties, to have inquired if architects, engineers, and builders could not devise some plan to save corn and grass from the ruinous swampy condition such weather leads to.

A dip in the British Museum Library has disclosed some particulars of the availability of buildings, as drying barns, to ripen corn and grass, and which, when once erected, will enable agriculturists to reap and to mow, regardless of fine weather for garnering.

Amongst other reliable works which we could call attention to is Garnett's "Tours in Scotland," the author of which, as secretary to the Royal Institution of London, at the latter end of the eighteenth century, inquired, by personal travel, into the state of agriculture in the Highlands of Scotland. He visited Inverary Castle, the seat of the Argyle family, where the money laid out by successive Dukes of Argyle, from 1745 to 1800, in improving and building on the estate, amounted to 250,000*l*.

At a farm called Glen Shira, about two miles distant from the town of Inverary, the secretary to the Royal Institution came upon the duke's drying-barns, buildings found to be very useful in so wet a climate as the Highlands, for by means of these barns hay may be made or corn dried during the heaviest rains. This was not a mere experiment, but a veritable fact proved year after year.

The building in question stands across a valley, and is of circular form, so contrived as to cause a draught of air even in calm weather, there being open arches opposite to each other throughout the whole building. [After the principle, perhaps, of the drying-sheds at Vauxhall, where cakes of whiting are packed after being moulded.] The drying-barn is divided into two stories, and the upper one is used for drying; the lower one consisting of cow-houses and other conveniences. The floor of the upper story is made of small boards or battens about 1 in. distance from each other to receive the benefit of the air below. There are likewise openings in the sides of the walls at convenient heights to receive the hay and corn from the carts. On this floor the grass is laid soon after it is cut; a few hands serve to turn it over for two or three days, when it is found perfectly dry and of finer flavour than hay dried by the hot sun.

In this story are jointed frames of wood, suspended from the roof at convenient distances from each other. These frames have a number of sharp-pointed pegs on each side of them, inclining upwards, upon each of which a sheaf of corn is hung to dry.

The frames, by means of joints, are lowered down to receive the corn, and when the drying is finished they are moved up again, to be out of the way.

So fully convinced of the utility of this mode of drying was the spirited landlord, that he fitted up several small barns for that purpose on different parts of his estate. The barns have several small beams running parallel to each other across the breadth of the room; from these are suspended a great number of long poles filled with pegs, on which the sheaves of corn are hung. The corn in the West Highlands is often cut down before it is ripe, and can scarcely ever be well dried by exposure in the open fields.

Dr. Smith, in his "Agricultural Survey of Argyleshire," gives a particular description, with a plan, of these drying-barns; and as their erection cannot be of very heavy expense, there is time now to build and save the thousands of acres of corn which otherwise appear doomed for ploughing up.

Great improvements in the original drying-barns might soon be effected by the building world, aided by engineering skill; drying-fans, or even the fans used at Indian bungalows, might expedite the ripening of the harvest, under cover of suitable buildings.

Some years ago, the *Builder* brought this question of artificial drying prominently before its readers. Some time afterwards an invention for effecting it was perfected, and has been employed satisfactorily, the expense being the only objection.

THE EXCAVATIONS FOR CHILD'S NEW BANK BUILDINGS.

ANCIENT UNDERGROUND STRUCTURES.

THE prediction that in getting out the foundations for Messrs. Child's new bank buildings some structures and remains of an interesting historical character would be met with has already been verified, although the excavations at present have been carried out only to a limited extent. For the new building an area of about 15,000 superficial feet is being excavated to a depth of 18 ft. below the level of Fleet-street, and this involves the removal of about 204,000 cubic feet, consisting for the most part of massive underground brickwork. Brick walls running both east and west, and north and south, 4 ft. and 5 ft. in thickness, have been met with; and at the rear of the site under excavation, and immediately adjoining the old building—now demolished—known as "The Devil's Tavern," a wall has been found, 7 ft. in thickness. Each side of this wall consists of brick, and the central portion, which can be traced running from south to north as far as the site of Temple Bar, is of flint and chalk, leading to the suggestion that it is a portion of old London Wall. Close to this 7-ft. wall, in excavating the earthwork, a number of skulls and other human remains, including a skeleton in an almost complete state, were met with. Several of the skulls and other portions of the remains thus discovered have been preserved, and are under the care of Mr. Munday, who is superintending the excavations as foreman of the works to Messrs. G. Smith & Son, the contractors for the new building.

Perhaps the most interesting underground structures which have been met with during the progress of the works are those which have been discovered near the Fleet-street frontage, immediately under the site of the old bank buildings, and also at the east end, running from Fleet-street southwards. The first-named discovery consists of a number of Gothic arches, of fire-stone. These arches spring from octagonal piers, and are four in number, built at right angles to each other. To the east of these, and in connexion with them, on the same underground floor level, is what may be termed a vaulted corridor running in a southerly direction several yards from Fleet-street. This discovery came upon the workmen by surprise, and was unexpectedly made after they had come to what they considered the extreme depth of the cellar floor level. The vaulted

corridor was, however, found to be several feet lower than the cellar floor just named. The Gothic stone arches are to a great extent filled in with brickwork, which it is manifest was executed at a much later period than the building of the arches themselves. What may have been their original purpose or design will perhaps form a study for those interested in archæology, but taken in connexion with the human remains found at the rear of the intended new bank buildings, it is not unreasonable to assume that the arches in question may have formed the crypt of some religious house long before Child's old bank was erected on the site.

M. DORÉ'S NEW PICTURES.

THE "Ascension" and "Ecce Homo," added to the Gallery in Bond-street, give us little pleasure. In both these pictures M. Doré has succeeded in covering much fresh canvas, but not in conveying any new ideas. Of the "Ascension" we are forced to say that it is bad in colour and worse in form. The clouds are neither those of heaven nor of earth, nor are they clouds of smoke, but rather like the white steam vapour blown from a locomotive or a ship of the Cunard line. The Saviour, in a "Transfiguration" attitude, rises as from amongst a crowd of goggle-eyed female angels, mostly ungraceful and ill-drawn, with an abundant allowance of marabout wing-apparatus. In the far distance is a sea, bluer than the sky, from which it ought technically to borrow its colour. If this be an ascent to glory it must be the glory "*de la belle France*," and not that of Heaven triumphing over Death and Sorrow. The design is meanly conceived, and the method of execution more ignoble still than the design. It is positively immoral to degrade thus a scene that to many simple-minded persons is lofty, glorious, and devotional. That group by the shore of the preternaturally blue sea represents the Apostles, but they have their backs to us, and Christ His back to them. Why this arrangement? Purely that He may look impressive to the British public who have paid their shilling and come to see the Exhibition. The "Ecce Homo" is a little better painted, but still unworthy and undevotional. It shows a great flight, not of imagination, but of steps leading up to a building, which these same steps render of almost impossible construction. The colossal crowd at the bottom is being kept back by a couple of soldiers; one head is well foreshortened, but some of the figures stand high enough to be on the heads of the others nearly, and this seems past explanation. The vulgarity of the cloud is totally un-Eastern. At the top of the flight another crowd is issuing from the judgment-hall; but not a single figure of grace is shown as they fill an ill-designed Roman portico; and perched up high behind, on a throne over the heads of all and right in front of the entrance, is Pontius Pilate. The Saviour, in a red garment, is descending alone with a crown of thorns and a glory round the head. The figure ought to be accompanied by guards. Pilate went forth, and Jesus followed wearing the crown of thorns, "*et purpureum vestimentum*," and a purple robe, which is scarcely M. Doré's colour; "*et dicit eis Ecce Homo*," "and Pilate saith unto them, 'Behold the Man'"; but Pilate is sitting at the back far away, and could say nothing of the kind. In fact, M. Doré has taken no trouble whatever to realise the situation. The picture is without form or colour or chiaroscuro, and these are the three things that constitute a picture. When Michelangelo refused to paint devotionally he excused himself, saying he painted difficulties, and that that was the path to exalt the soul; for "good painting is of itself noble and devotional." It is a pity M. Doré cannot be got to see this, for he is a remarkable man and has shown versatility and power, but he has tried to do too much. Milton, Dante, the Bible, Cervantes, and Rabelais he has successively attacked and maimed. Any one of them would take a greater man than he is a lifetime to treat justly. He degrades what he professes to illustrate. We say this with pain; but it is time some one spoke out.

WOLVERHAMPTON PARK COMPETITION.

IN reply to an advertisement from the Wolverhampton Council inviting plans, specifications, and detailed estimates for laying out the interior portion of the Park, at an expenditure not exceeding 5,000*l.*, the first and second successful competitors to be entitled to a premium of 50*l.* and 25*l.* respectively, twenty-seven designs were received, and immediately placed in the council chamber for public inspection. The borough surveyor was instructed to consider them, and report whether they complied with the general conditions. His report was submitted to a special meeting of the committee on the 13th of June ult., and as a result, three designs, viz.—"Spe labor levis," "Al Fresco," and "Fortuna Sequatur," were selected for further consideration and a detailed report.

At a subsequent special meeting of the committee on the 20th of June, a further report from the borough surveyor was presented on the three mentioned designs (and on the one under the motto of "Sylvander" at the request of the chairman). After examination of the plans, and upon a division of seven votes to two, it was resolved "That the first premium of 50*l.* be awarded to the author of the design 'Spe labor levis,' and that his design be accepted as the one to be carried out if all the conditions stipulated are complied with. That the second premium of 25*l.* be awarded to the author of the design 'Fortuna Sequatur.'"

The committee found that Mr. R. H. Vertegans, of Edgbaston, is the author of "Spe labor levis," and Messrs. W. Barrow & Sons, of Derby, are authors of "Fortuna Sequatur." Mr. Vertegans's tender for the execution of the works included in his specification has since been accepted.

Messrs. J. Law & Son are to form the roads.

SPELTHORNE SANATORIUM, BEDFONT.

THE sanatorium, which has been established under the initiation of Miss Helena Autrobus, is taking a satisfactory shape. The premises adopted for the institution, and named the Spelthorne Sanatorium, were opened on the 1st of January last for the reception of inmates. The house is arranged for the accommodation of twenty patients, and a staff, consisting of a lady and an assistant lady superintendent, and a working matron. A large room on the ground-floor is used as a class and work room, and there are convenient kitchen and other domestic offices. A short distance from the house a range of buildings has been converted into a commodious laundry, fitted with all the necessary appliances, and intended not only to do the washing of the sanatorium, but, by taking in washing, materially to assist the funds. The expense of adapting and furnishing the house and laundry has been very great, and the public are asked to assist. The committee see before them a large field for work, and hope, if liberally supported by the public, to introduce several kinds of lucrative and useful employment, thus interesting the patients and developing their capacities. The house is provided with kitchen and flower-garden, a large paddock with outbuildings for poultry, and various other conveniences, inclosed in four acres of land, and the whole, owing to unusual and most fortunate circumstances, has been obtained for the very moderate rental of 100 guineas. An iron chapel has been erected, and the sanatorium was opened with a service in it, on the 1st of January. No patient is received for a shorter term than twelve months, as the committee are advised, and as it has been proved by experience, that shorter periods are futile to accomplish any permanent cure. It is a good work, and we cordially desire its prosperity.

ROYAL HORTICULTURAL SOCIETY.

A SCHEME has been proposed by Mr. Samuel Jennings for the erection of a public gallery and promenade, on the plan of similar buildings on the Continent. The designs and estimates have been prepared and submitted by Messrs. John & John Belcher, architects to the Council of the Royal Horticultural Society. The gallery consists of a covered promenade running from Exhibition-road to Queen's-gate, nearly midway between Kensington and Brompton roads. Shops are arranged on each side, intended partly for the sale of fruit and flowers, and partly for works of art.

In answer to Mr. Reginald Yorke on Monday evening last, the Chancellor of the Exchequer stated that plans for the utilisation of the ground now occupied by the gardens of the Royal Horticultural Society at South Kensington were under the consideration of Her Majesty's Commissioners of 1851, and that the decision arrived at would, no doubt, be in accordance with the original design of employing the estate for the promotion of science and art.

NORTH LONDON COLLEGIATE SCHOOL FOR GIRLS.

THE North London Collegiate School and the Camden School for Girls are the titles of the upper and lower schools founded by Miss Buss, and carried on by her independently for upwards of twenty years. They were made permanent institutions some few years ago by the voluntary surrender of her proprietorship to certain trustees for carrying on the same under her management.

The great success attending these schools for girls' higher education has led to their further development, and the Charity Commissioners have authorised a scheme projected by the Brewers' Company for the erection of permanent buildings for both the upper and lower schools, each of which is to accommodate 400 pupils, and to be erected on distinct sites. The plans for both schools have been prepared by the architect to the trustees, Mr. E. C. Robins, F.S.A. A contract was entered into with Messrs. Manley & Rogers for the conversion of the late Governesses' Institution in the Prince of Wales-road, Kentish Town, to the purposes of the Lower or Camden school, at a cost of 7,500*l.* Like the former building (of which very little is left), it is in the Tudor style, and faced with Kentish rag and Bath stone dressings. On the ground-floor provision is made for the class-rooms, drawing and science schools, and the gymnasium. In the basement are two spacious cloak-rooms, lavatories, &c., dining-room, kitchen, and other offices. This building was completed twelve months ago.

The North London Collegiate School, which was opened by the Prince and Princess of Wales on the 18th inst., will entail an expenditure of some 15,000*l.* The old school-house in Sandall-road will be partially removed, and an additional story and a new front will be added to the remainder. The ground is now covered with the new buildings, which will give accommodation for upwards of 400 girls. The principle adopted in the classification of the pupils is that of separate classes of thirty pupils in distinct class-rooms, five of which open into the great hall on the ground-floor level, and five on the gallery level. The examination-hall is used not only for collective purposes, but affords space for the withdrawal of pupils from each of the class-rooms as occasion may require. In this hall the annual prizes will be distributed, which hitherto has had to take place in hired rooms. The Clothworkers' Company have given 2,500*l.* towards the erection of this hall, and it has been named the Clothworkers' Hall in consequence. A colonnade of Mansfield stone piers and arches sustains the gallery. The whole of the interior walling is lined with red bricks and stone dressings, except where the pine dado occurs. The exposed timbers of the roof and the panelled boarding are stained and varnished. The dining-room, kitchen, cooking-school, and domestic offices are in the basement, as well as the cloak-rooms, &c. Over the board-room in the old building is the science lecture-room, while the teachers' and music rooms and servants dormitories occupy the remaining upper part of the right wing. The drawing-school and three class-rooms are on the second-floor of the new building, flanking the great hall. The gymnasium is in the garden in the rear. The warming and ventilation has been carefully studied. The builders are Messrs. Adamson & Sons, of Putney. Memorial-stones were laid in June last year. The organ has been presented by the pupils, and the stained glass by the architect. The cost of the school, including the land and the buildings upon it, will be 20,000*l.*

Very favourable opinions as to the hearing qualities of the hall were expressed on the day of opening.

SCAFFOLDING AT SOUTH KENSINGTON.

AT the rear of the Patent Museum, in Cromwell-road, South Kensington, is to be seen an extensive scaffold, erected for the new library and courts, now being built by Messrs. Perry & Co., of Stratford, for the Science and Art Department. This scaffold is upon what is known as Moffatt & Batt's patent system, shoes and rings taking the place of scaffold-cords. The scaffold in question is some 300 ft. long, and will be carried up about 70 ft. It presents a neat and novel appearance, and is well worthy the notice of builders and contractors. The present instance will afford a good test as to the utility of this patent system.

CROYDON HIGH SCHOOL FOR GIRLS.

LAST week the memorial-stone of the new building in course of erection in Wellesley-road was laid by the Archbishop of Canterbury, in presence of the Chairman and Council of the Girls' Public Day School Company, the parents of the pupils, and others interested in the movement.

The building is intended for the reception of 300 pupils. The architect to the building is Mr. Charles Henman; the builder is Mr. Wm. Marriage; and the clerk of the works is Mr. J. A. Clark.

The amount of the contract for the building is 7,150*l*. The stone, which is a fine specimen of Peterhead red granite, was cut from a rough block and polished at Mr. J. Stephens's steam masonry works, Croydon. The trowel, which was provided by Mr. Henman, the architect, and used by his Grace, was designed by Mr. H. Walter Lonsdale, the ivory handle being surmounted by three figures, girls, representing reading, writing, and mathematics, and round about it were carvings of books inscribed with the subjects taught in the school.

The site of the building overlooks the grounds of the Whitgift School. It has an area of about three-quarters of an acre, the frontage being 176 ft. and the depth 222 ft., of which the buildings will occupy 126 ft. by 54 ft., leaving ample space for an excellent playground.

On account of the fact that a portion of the site had been used as a gravel pit (and afterwards filled in with made earth), it was necessary, in parts, to take the foundations to a considerable depth; in doing this, every particle of made earth has been removed from the area of the buildings, and clean fresh gravel filled in instead. Partly owing to this, partly in order not to raise the buildings too high, and partly on the score of expense, the lowest floor has been kept about 4 ft. below the level of the road. So as to obviate all chance of dampness, there will be an asphalted pathway 4 ft. wide round the building, sloping from it towards a channel which will rapidly carry off the rain water. This channel will be met by a turfed slope of easy gradient, starting about 16 ft. from the buildings; so they will not appear to be buried, nor will the access of light and air to the lowest story (which has a height of 10 ft. be impeded in the smallest degree. Nevertheless, there are are no class-rooms at this level, it being divided into cloak and dressing rooms, lavatories, music-rooms, a luncheon-room, kitchen, and usual offices in connexion therewith, a spare room, &c. The next story has a height of 12 ft., and contains four class-rooms, each 24 ft. by 20 ft., one 29 ft. by 20 ft., and one 19 ft. by 20 ft.; there is also an office for the head-mistress, with a waiting-room adjoining for visitors. The chief entrance is on this floor, and it is in the porch that the Archbishop laid the memorial-stone. A corridor 9 ft. wide runs through the whole of this story; at each end of it are the staircases (10 ft. wide), giving access to the floor above, on which is the assembly-room, 60 ft. by 30 ft., with a gallery at one end to afford additional accommodation, and for singing-classes. This room will be 22 ft. high, with a panelled and moulded ceiling. On this floor there will be two class-rooms 24 ft. by 20 ft., one 29 ft. by 20 ft., and one 19 ft. by 20 ft., each having a height of 12 ft. Included in the buildings are a studio with north top-light, a residence of five rooms for the head-mistress, and servants' rooms. The materials are red brick and pale buff terra cotta, with brown tiles on the roofs.

THE STREET GATES AND BARS IN LONDON.

WE are glad to learn that the St. Pancras Vestry have entered upon a crusade against the street gates and bars in their portion of the metropolis. At their last meeting a motion was brought forward to the effect that in the opinion of the Vestry it is desirable that the gates and bars across the streets should be removed, and the thoroughfares made free to all, and that it be referred to the General Purposes Committee to consider as to the best means to be taken to accomplish the object. It was justly urged that the removal of the street bars would be a great public benefit; that the bars were a great obstruction to the public, and that Tottenham-court-road and Hampstead-road were greatly affected by the existence of these bars in the side streets. One of the members observed that the removal of the gate in Woburn-place would open out a direct communication between Hampstead and Highgate to Holborn and Great Queen-street, and Lincoln's-inn-fields, the Law Courts, the Strand, and Fleet-street. The motion was adopted.

DURHAM CASTLE.

IT having transpired that alterations are about to be made in the Upper Hall of Durham Castle, which alterations, it is alleged, will materially injure the building, a special meeting of the Durham and Northumberland Archæological and Architectural Society was convened by the President (the Rev. Canon Greenwell, F.S.A.), "to take such steps as might be thought desirable to avert, if possible, so deplorable a catastrophe." The President occupied the chair, and said that he had taken upon himself, as president of the society, to call that meeting. He directed the attention of those present to the deplorable destruction of the old Chapter-house at Durham, and which had been so much condemned. It must have been done by the authority of some one; but when inquiry was instituted, the blame was generally thrown from one person to another. This served to show how dangerous it was to trust to the chapter of accidents to prevent a work of destruction of this kind. He had felt it his duty to call them together to take some steps, if thought desirable, to prevent a destruction almost equal, in an historical sense, to that of the destruction of the Chapter-house. He was sorry that the necessity had arisen for such a meeting being held, as they naturally supposed that the ancient castle, the former residence of the Bishops of Durham, would of all places be the last to be interfered with in the way of destroying its historical features. It was the great palace of the former bishops of Durham, and was used as a place of protection and a barrier to Scotch invasion. It was a public building in the same sense as Windsor Castle, and was transferred to the University in trust to be made use of as a university and in trust to be preserved in order, and not to be treated as a piece of private property and swept away, but well preserved for centuries yet to come, as a great historical and architectural monument. First one place and then another had been swept away by learned bodies, so that they need not be surprised that injury to the architectural features of the castle were contemplated by the University of Durham. The upper hall of the castle was erected over the grand hall, and it was built under the direction of that great ecclesiastical builder, Bishop Pudsey, to whom we are indebted for some of the best pieces of architecture of the latter part of the twelfth century. The great hall was the common room, and was approached by a piece of Norman architecture in the shape of an arch. The second or upper hall was above this room, and for architectural beauty there was nothing in England like it, and no building to be compared to it for the very beautiful arrangement of the arcades around each side. Some time during the past century it was divided by a wooden partition for the use of the bishop and his officers. It has since been used as rooms for students, and it remained in that condition up to the present alterations. The other day his friend Mr. Rogers mentioned that something was going on in the Norman gallery, and he went and examined the place. He also looked at the plans, and saw that the alterations meant the entire destruction of the hall. It was proposed in the plans to run a passage along the centre of the building, rooms on each side, so that it was intended to split up the gallery into bits, and each student would have a portion of the arcade in his room. This would have been detrimental to the building and very dangerous as regards the preservation, because when portions of these were enclosed in students' rooms they were in danger of being damaged. Students were generally young men who cared little or nothing about architectural features. According to the plans there was absolute destruction intended, and he could not conceive how it was possible that any body of men could have dreamed of doing this damage. They had broken through an old wall that had stood for 700 years, which was certainly more or less decayed, simply to provide four more rooms for students. The wall was perforated by four flues for fires. This was a material destruction, and he apprehended the greatest danger from it, as the perforation might in a few years bring the old walls down altogether. They also proposed to open out two windows from the arcade. The arcade consisted of two blank arches on each side, and these were to be perforated, which would destroy those features which they wished to retain. Therefore he thought he was not wrong when he said the whole thing would be destroyed, and that no person would have been able to see the effect of that beautiful hall, which would be entirely injured by the perforations. Of course it might be said that old buildings must be used up as the exigencies of the times required. It was far from him to say that buildings could be preserved as they were. They must be altered from time to time to meet the purposes of the age. But here he saw nothing to justify this interference with such a grand specimen of architecture, even supposing that fifty additional rooms were to be obtained. The University possessed property on the Palace-green, Dun Cow-lane, and the Bailey, and surely, he thought, they could provide accommodation for an increased number of students in some of those places.

After some remarks by Mr. C. H. Fowler, Mr. W. H. D. Longstaffe, and others, the meeting adjourned to the Norman gallery of the Castle, where a number of workmen were engaged in the work of alteration.

Mr. Booth proposed, and Mr. Heath seconded, the following resolution:—

"That this Society has heard with extreme regret of the alterations in progress in the Norman gallery within the Castle of Durham; that any alteration which would have the effect of interfering with the Norman arcade, or of enclosing it from view, would be most deplorable; and this Society desires to express an earnest hope that such an alteration will not be made. The Society is glad to have received a communication from the Master of the University College that the work has been temporarily suspended for re-consideration, yet think it desirable that this resolution should be forwarded to the Warden and Senate of the University, with the strong opinion of the Society that the entire upper hall lighted by the arcade should be cleared of the existing lath and plaster divisions, and thrown into one room, which would both show the proportions and original character of the hall, and also materially lessen the probability of accidents from fire."

The resolution was carried unanimously.

THE INDIAN MUSEUM.

MR. W. H. GREGORY, in a letter to the *Times*, pleads that the archæological collections of this museum be not immured in the regions of Nox and Erebus in the cellars of the British Museum, where they will be in company with other Indian archæological works which have undergone a similar condemnation for many a long day. He proposes that a portion of the space now occupied by the Indian Museum should remain assigned to the archæological and art objects contained in it. "To these should be added those specimens now stowed away in the British Museum, and also the fine collection of photographs illustrating the monuments of India, which are, I believe, at present in the Indian Library at Downing-street, and which are rarely resorted to owing to difficulty of access and want of proper room to study and to copy. To these should be added the coins of India, of which the British Museum authorities might select such specimens as they require, giving in return to the Indian Museum electrotypes of their Indian coins. To the authorities of the Kensington Museum I would intrust the custody of the new museum, which would only involve the expense of a few attendants. There then remains the expense of the director. This is all the outlay which would be at present required, as cases are already provided. But by far the most important recommendation which I can make is the appointment of a consultative body, whether it be called a committee or a trust, to advise and strengthen the hands of the director. Can there be a doubt that with men on this trust (I take a few names at random from among the many which suggest themselves) such as Sir Henry Rawlinson, Mr. Grote, Mr. Fergusson, Sir Edward Clive Bailey, Mr. Grant Duff, the new Indian Museum of Archæology and Art would become the resort of those who interest themselves in the literature and antiquities of this great portion of the Eastern world, and that they would act in concert with and encourage their fellow-workers in India?"

In answer to Mr. Percy Wyndham in the House of Commons on Monday night, Mr. E. Stanhope said:—"I hope that the hon. member for the Elgin Burghs will have an opportunity before the close of the session of bringing on his motion in reference to the Indian Museum. Before that time no definite steps will have been

taken for the removal of the collections. . . . . The question of a contribution from Imperial funds towards the support of an Indian Museum has been more than once considered between the India Office and the Treasury, but without any result."

RECLAMATION OF BRADING HARBOUR, ISLE OF WIGHT.

A CORRESPONDENT writes to say that the arduous work of reclaiming Brading Harbour, which has been carried on with unremitting diligence during the last two or three years, has now terminated successfully, and an immense tract of what we hope will be ere long arable land added to the island. Mr. Saunders has had many difficulties to contend with; but it was only to be expected that, with all modern appliances at his command, he would at least be as successful as his great predecessor in the same work two centuries ago, Sir Hugh Myddelton, of New River fame.

The *Isle of Wight Advertiser* says,—"The water is shut out of Brading Harbour! The company to this time have expended some 80,000*l*., and have as a return for the investment about 700 acres of land, which it is estimated will, in some five to seven years, fully recoup the outlay. In addition, they have already constructed a railway to their quay, and have all preparations made for laying a line of rails across the site of the late harbour to Bembridge. What are the sources of profit that must arise from this new development of so lovely a district as that of Bembridge, it needs no words to enforce. The neighbourhood, although full of opportunities for the most profitable development, has, by its peculiarly isolated position, remained an unknown spot to the world, not excluding that part of its inhabitants who are found on the Isle of Wight, of whom not a tenth part have ever visited it." In addition, a large trade in connexion with the railway and the quays may be anticipated, returning, as we hope, well-merited profit to those who have embarked their capital in the venture, as also a gratifying reward to the designer, who has been the almost unremitting superintendent of the work during its long and toilsome process.

ARCHÆOLOGICAL SOCIETIES.

Sussex.—The annual excursion of the Sussex Archæological Society has been fixed for the 14th prox. Brighton will be the *rendezvous*. The members will meet in the Museum, and visits will probably be made to Ovingdean Manor House and Church, Rottingdean, and such other of the secluded villages in the district as time may permit. The oldest church in Brighton, St. Nicholas, will not be passed without notice.

Bedfordshire.—The annual excursion of the Bedfordshire Architectural and Archæological Society took place on the 15th inst., to Leicester, where the members were received by Mr. A. H. Paget, a member of the local Society, who acted as guide. The excursionists visited the remains of the Newarke and Trinity Hospital. The church of St Mary in the castle would alone have repaid the exertions of the day. The story of its successive changes, down to the recent restoration under Sir Gilbert Scott, was traced by Mr. Paget and the vicar, Canon Broughton. The next church on the route, scarcely less interesting, was St. Nicholas, bearing external evidence of having been largely indebted in its construction to Roman remains found in its immediate neighbourhood. Here also (says the *Bedfordshire Times*) the incumbent, the Rev. T. W. Owen, assisted in extracting the history of the structure from the Saxon or early Norman clearstory windows lately brought to light in the process of restoration (similar to those found in Turvey church), and the various Norman features still remaining in the tower (where some herring-bone work may be also seen), and in the north side of the nave from which the aisle has disappeared; the old wall, nevertheless, is retained, with its arches and other openings filled up. In close proximity to the churchyard stands the famous "Jewry wall," one of the most remarkable specimens of Roman architecture now to be seen in this country. On the east or exposed side, it is pierced by a series of four massive arches, with a central niche or recess of brickwork turned in a mass of rubble, banded at intervals by courses of quarry tiles. These articles are respectively 11, 12, 13, and 14 ft. high (the soil below the present level of the street having been excavated to their base) and 14, 6, and 11 ft. broad. From the relative position of other Roman buildings, traces of which have been from time to time discovered, it is believed that this wall formed some part of a cluster of edifices extending from this spot towards the river, and forming a portion of the town of Ratæ or Roman Leicester. The afternoon was devoted to the inspection of the church of St. Martin, the history of which has been written by Mr. T. North, one of the hon. secretaries of the Leicestershire Society. Other objects of interest examined were the Guildhall, the Town Library, the mayor's parlour, the church of All Saints (of which it is said by the Rev. G. A. Poole, in his papers on the "Churches of Leicester, 1854," "that it would afford more hints than all the rest for a town church of moderate pretensions") and St. Margaret's, which contains the tombs of Penny, abbot of Leicester, and of Newcombe, the early bell-founder, and whose tower holds one of the finest peals of ten bells in the kingdom. An hour was spent in a cursory glance at the Museum.

Surrey.—The Surrey Archæological Society has just held its annual country meeting. Lord Hylton acted as president for the day, and entertained the excursionists at Merstham. The party afterwards visited Merstham Church, which they found to have been restored more than once since their former visit. The carriages then proceeded to Chaldon Church, where a paper on its architecture was read by Mr. Nevill, F.S.A., followed by Mr. J. G. Waller with a description of the wall-painting. Chipstead Church was next visited, where Major Heales, F.S.A., commented on the history of the building. Thence the party went to Gatton Hall, by the kind permission of Mr. Robert McCalmont; and at Gatton Church, Canon Cazenove, the rural dean, called attention to the woodwork brought from Flanders. The meeting ended by a collation at the Reigate Public Hall, at which Lord Hylton presided.

The Archæological Institute.—Taunton has been selected as the place of meeting for this year's meeting of the Royal Archæological Institute. The congress will commence on Tuesday, August 5, and will close on Tuesday, the 12th. The programme includes visits to Dunster Castle, Quantoxhead, Bridgwater, Ilminster, Montacute House, Bishop's Lydeard, Barrington Court, Norton Fitzwarren, Staple Fitzpayne, Kingston, Cannington, Cothelstone, Fairfield, St. Audries, Wells Cathedral, and Glastonbury Abbey; and on three evenings there will be *conversaziones* and receptions in the Castle or the town-hall of Taunton. The churches and Castle of Taunton will also be inspected by the members, and will form the subjects of papers.

WATER SUPPLY FOR LIVERPOOL.

THE Liverpool Corporation, after having had under discussion for more than two years past their future supply of water, appear at length to have finally decided upon a scheme, for which there is every reason to believe application will be made to Parliament during the session of 1880. They have in turn had under their consideration no fewer than five different projects, namely, one for a supply from Bleasdell, a district situated between Preston and Lancaster; three others for a supply from lakes Windermere, Ullswater, and Haweswater, in Westmoreland and Cumberland respectively; and, lastly, their attention has been almost exclusively directed to a supply from the waters of Vyrnwy in Wales. It is the last-named project which will in all probability be adopted. According to a statement made by the chairman of the water committee, at the meeting of the Town Council last week, the Bleasdell, Ullswater, and Windermere projects have been definitely abandoned, the Haweswater and Vyrnwy schemes only being entertained. Speaking on behalf of the committee, he said they had decided to recommend the council to adopt the Vyrnwy scheme, although he admitted that some members of the committee were in favour of the Haweswater project. In the outset, he observed that the waters in the two districts were equally pure, and he then proceeded to state the reasons which had induced the committee to fix upon the Vyrnwy undertaking, the estimated cost of which he said was 1,500,000*l*. He incidentally observed that it was a portion of a scheme originally designed by Mr. Bateman for the supply of London. Adverting to the works which would be necessary in carrying out the project, he said they would include an embankment 372 yards long, and 80 ft. high, which would form a lake five miles and a half long, and 60 ft. deep, over the larger portion of the area. Shafts had been sunk on the site of the proposed embankment, and the hard slate rocks of the district had been found within a few feet of the surface. A tunnel two miles and a half long would convey the water into the Hermant Valley, and from that point there would be an aqueduct to Prescot, near Liverpool, the pipe-line of which would be sixty-eight miles long, and crossing the upper part of the Mersey above Warrington, not far from the point where it joins the Irwell. The scheme, he observed, was far from being beset with engineering difficulties, and could be carried out in two years less time than the Haweswater project. He added that both in the Vyrnwy and Haweswater projects it would be necessary to remove a church and churchyard, but this could be done in such a way as to avoid any annoyance to the surviving relatives of those who had been buried there. At Haweswater it would be necessary to form a tunnel four miles long, through the hard rock of the district, whilst the aqueduct line would be twenty miles longer than that required in carrying out the Vyrnwy scheme. The pipe line, moreover, of the Haweswater project would have to cross three rivers,—the Lune, the Wyre, and the Ribble, at many points under great pressure, and finally the Haweswater scheme would cost a quarter of a million more than the Vyrnwy scheme, the adoption of which was strongly recommended by Mr. Hawksley and Mr. Bateman, the eminent water engineers. He added that the committee strongly urged the purchase of the gathering-ground, as had been done in the Thirlmere district by the Manchester Corporation.

In the discussion which followed it was agreed that one of the two schemes must be adopted, the only objection urged against the Vyrnwy project as compared with Haweswater being that the colour of the Vyrnwy water was not so clear as that of Haweswater, but in answer to this it was urged that the filter beds would make the former water equally clear. The general feeling of the council appeared to be in favour of the committee's recommendation, but the discussion was adjourned for a fortnight in order that the members of the council might pay a visit to the Vyrnwy district, and at the adjourned meeting it is understood that one of the two schemes will be finally adopted.

WATER SUPPLY.

Manchester and Liverpool.—The report of the deputation from the Liverpool Water Committee which waited upon the Manchester Water Committee recently has been issued. The object of the deputation was to ascertain if the Manchester Corporation were disposed to enter into an agreement with the Corporation of Liverpool either for a supply from the Thirlmere aqueduct for a term of years, or for joint action in the construction of an aqueduct from the Lake District. In reply to the questions of the deputation, the Manchester committee stated that they could not undertake to deliver water on the 1st of January, 1886, and that they were not prepared to pledge themselves to any date on which they would guarantee the delivery, or to expedite the execution of their works without some inducement to do so. Without, however, pledging themselves to any date of commencement, the Manchester committee expressed their willingness to negotiate with the Liverpool Corporation either for a permanent supply of water for Liverpool, or a supply for a period upon a fixed annual payment, and they also stated that, subject to the application being made before the completion of the first instalment of the works, they were prepared to admit that Liverpool was entitled to a supply under the 81st section of the Manchester Corporation Waterworks Act, 1879. The committee have reported to the Liverpool Town Council, expressing their opinion that it is not advisable to rely on the Manchester scheme, and they recommend that a supply should be obtained from the river Vyrnwy, in Montgomeryshire. We give under another heading some particulars of the proposed supply.

Wakefield.—The Wakefield Corporation have decided to promote a Bill in the next session of

Parliament for empowering the Council to obtain a supply for the borough and neighbourhood from the Rishworth Moors, near Ripponden, in the West Riding of the County of York, and to construct the necessary conduits, reservoirs, and other works in connexion therewith. The works are estimated to cost 160,000*l.*, and the scheme has been prepared by Mr. Filliter, the engineer to the Waterworks Committee.

Hull.—The Waterworks Committee of the Town Council of Kingston-upon-Hull on the 11th inst. proceeded with Mr. Bateman, C.E., to the works of the Newington Waterworks Company. They then went to Spring Head, where they inspected the machinery and the various routes suggested for the proposed new adit; and afterwards by way of Kirkella, Willerby, and Kelgate and the mill-dam springs to Cottingham. The engineer and committee subsequently proceeded to Driffield, and inspected the various streams in that locality, including Nafferton Beck. The committee have requested their engineer (Mr. D. Maxwell) to furnish Mr. Bateman with particulars of the other sources of the river, requesting him to report as to the feasibility and desirability of going to those sources for the future supply of Hull.

THE CITY OF LONDON SCHOOL COMPETITION.

ON the 18th inst. a special meeting of the Court of Common Council was held, when, on the reception of a report of the City of London School Committee, submitting three designs for the proposed new buildings for the school on the Victoria Embankment, Mr. W. Hudson presented a petition from thirty-one of the architects who had submitted designs for the school. The prayer of the petition has already been given in our pages. The consideration of the report and petition was adjourned. It may be mentioned that Mr. Robert Walker, one of the deputation who attended in support of the petition, replied to a number of questions addressed to him by various members of the Court. One of the cross-examiners was Mr. Lawley, who asked whether the petitioners, in sending in their designs under the terms of the advertisement, really believed that experts would be called in to advise the Corporation before a decision was arrived at? Mr. Walker's reply was in the affirmative, and Mr. Lawley followed with the rejoinder, "Then I don't believe it." Of course, Mr. Lawley was called upon to withdraw the remark, but he did so with a very bad grace.

Mr. Deputy Burnell gave notice of the following motion for Thursday, 24th:—

"That this Court deeply regrets that a member in his place, when putting a question to a gentleman at the bar of the Court, should have forgotten not only his dignity by a rude reply, but the duty which he, in common with every member of the Court, owes to his lordship, frankly to obey his lordship and promote freedom of debate, regularity of precedence, and a loyal regard to the rights of individuals, and this Court desires to disclaim any sympathy with the insinuation intended by the remarks of that member."

At the same meeting the petition (presented on the 18th instant) of various architects who have submitted designs was to be considered, together with Mr. James Edmeston's motion as follows:—

"That before proceeding to determine which design for the City of London School shall be selected for execution, all the designs sent in shall be submitted to the President of the Royal Institute of British Architects, who shall report thereon, distinguishing, in their order of merit, those three designs in which the instructions issued by the committee to competitors have been most efficiently carried out, and that the premiums be awarded accordingly. That for this purpose the mottoes be covered over and the sets of designs merely distinguished by numbers."

BUILDERS' BENEVOLENT INSTITUTION.

THE thirty-second annual meeting of this Institution was held on Thursday afternoon at Willis's Rooms, Mr. Edward Conder, president, in the chair. In the report, read by the Secretary, Major Brutton, the Committee point out how imperatively necessary it is that new subscribers should be found to take the place of those the Institution has lost by death. They therefore appeal to all connected with the building interests for their aid in support of the Institution. After thanking Mr. Conder for his generous liberality and energetic efforts during the year of his presidency, the report stated that seven pensioners were elected during the past year, and two widows of pensioners had become entitled to be placed on the list of pensioners, under Rule III. Notwithstanding the exceptionally severe winter, and the great age of most of the female pensioners, not one of them had succumbed, but the committee regretted to announce that six male pensioners had been cut off, all of them, however, at an advanced age, the youngest being seventy-six and the oldest ninety years of age. The deceased pensioners had been receiving the benefits of the Institution for periods ranging from six to fourteen years, the average being ten years. In conclusion, the report announced that the annual dinner will be held at the Freemasons' Tavern, on November 6th next.

The balance-sheet showed a total income of 2,743*l.* 14*s.*, including 671*l.* 14*s.* 3*d.* balance from last year, 794*l.* 18*s.* annual subscriptions, 552*l.* 3*s.* 6*d.* donations, 80*l.* profits of annual ball, 612*l.* dividends on Consols. The sum paid to pensioners was 1,332*l.* 19*s.*; 200*l.* had been devoted to the purchase of Consols; and a balance of 846*l.* 10*s.* 7*d.* remained at the bankers.

The report and balance-sheet were unanimously adopted, on the motion of Mr. Thomas Stirling, seconded by Mr. T. F. Rider, the chairman congratulating the Institution upon the satisfactory nature of the report, and expressing satisfaction that the prevailing depression had not particularly, if at all, affected the building trade.

Votes of thanks were given to the President, Vice-presidents, and Trustees; to the Treasurer (Mr. George Plucknett), who was re-elected; to the Committee; to the honorary secretary for the ball (Mr. F. W. Keeble); to the honorary auditors (Messrs. J. H. Hunter, J. Cruttenden, and R. J. Ward), who were re-elected; and to the secretary, Major Brutton (on the motion of Mr. G. B. New, seconded by Mr. Jeremiah Long, of Brighton). Mr. F. J. Dove was unanimously elected president for the ensuing year.

IMPORTANT TO BUYERS OF HOUSES.

ON the 15th inst., in the Exchequer Division, the case of Loseby *v.* Carr was disposed of.

It appeared that a Mr. Howell built four houses adjoining each other in the Rookery-road, on the Belvedere Estate, in Kent. The main drains of Nos. 7 and 8 were laid to carry the sewage from these two houses into the main drains of Nos. 5 and 6, and thence into a cesspool. In April, 1874, Howell conveyed Nos. 7 and 8 with their appurtenances to the plaintiff, and in June, 1874, Nos. 5 and 6 to the defendant. Up to the date of the conveyance to the defendant, Nos. 7 and 8 had never been occupied or the drains used. Subsequently, the defendant disputing the right of the plaintiff to use the drains of Nos. 5 and 6, this action was brought by the plaintiff to establish his right.

Mr. Harrison, Q.C., stated that, owing to the great rainfall of the present year, the sewage had actually been washed back into the basement story of the defendant's houses.

His lordship held, at the conclusion of the plaintiff's case, that as the drains of Nos. 7 and 8 had not been used up to the date of the conveyance to the plaintiff, the right to drain into the main drains of Nos. 5 and 6 was not in existence at that date. It therefore did not pass to the plaintiff by the conveyance to him by Howell of Nos. 7 and 8. The learned Baron remarked that it was like "giving a kick to a dead dog," commenting on the case of "Pyer *v.* Carter," 1 H. and N., 916, relied on by the learned counsel for the plaintiff, and which has been much discussed in several other courts. This case did not come within that, and, if it did, the latter had been overruled in a recent case in the Court of Appeal.

FINES FOR BAD BUILDING.

BUILDING without mortar seems to be a favourite practice amongst a certain class in the trade at Tottenham. Only a short time ago a builder was heavily fined for building with a compound of rubbish instead of mortar, and on Monday last three more were summoned before the magistrates at Edmonton for similar offences. James Wheeler, a builder, of Woodberry-villas, Seven-Sisters-road, was summoned at the instance of the Tottenham Local Board for wilfully using certain mortar in the erection of new buildings in Templeton-road which had not been approved of by the Local Board. Mr. De Pape, the surveyor to the Local Board, produced samples of the mortar used, which he had taken from the joints of the brickwork, in the presence of the defendant, and which mortar, he said, was utterly unfit for the purpose, containing straw, shavings, feathers, grass, and other rubbish. It was contended by the defendant's solicitor that the surveyor to the estate had passed the mortar, and that that was sufficient, as large advances were made to the defendant as the builder of the houses. The magistrates, however, took another view of the case, and fined the defendant 5*l.* in respect of each of seven houses built with this "mortar," making the aggregate amount of the fines 40*l.*, in addition to costs. Another builder named Arthur Jukes was fined 20*l.* for a similar offence in respect of four houses in Tewkesbury-road; and William Waller, also a builder, was fined 5*l.* in respect of a house similarly built in Templeton-road. The magistrates intimated that they would be sent to prison for fourteen days in default of payment; but their solicitor, Mr. Fowler, gave notice of appeal to the Quarter Sessions. The Local Board have since resolved to take further steps in the matter.

RESPONSIBILITIES OF LANDLORDS.

ANDERSON AND ANOTHER *v.* OPPENHEIMER.

IN this case, tried in the Queen's Bench Division, before Mr. Justice Field, the plaintiffs, who carry on business on the basement of a house in Queen Victoria-street, City, brought the action to recover from the owner the damage done to their property by the irruption of a quantity of water from one of the upper pipes of the building, in the following circumstances:—The building is let out in floors or "flats" to various tenants, and the plaintiffs are tenants of the ground floor and basement, at a rent of 800*l.* a year, under a lease granted in 1872 by the owner, the defendant, with a covenant for quiet enjoyment of the demised premises, "without any interruption from the lessor," the defendant. The house had been built by the defendant in 1871, and the water-supply to the different floors was effected by means of a cistern at the top of the house, supplied with water by the New River Company, and the water was distributed to each floor by means of a service-pipe, connected with the cistern, and into which, on each floor, there was a branch service-pipe, for the supply of the tenants of the floor, each floor having its own branch service-pipe for the purpose. The cistern was filled daily by the company, and the defendant paid the rate, but, by arrangement with the tenants, receiving from the plaintiffs half the sum paid. The cistern is not demised to any of the tenants. The injury to the plaintiffs' stock in respect of which the action was brought arose from the sudden bursting of the branch pipe of the first floor, the water from which passed down into the basement, where the plaintiffs kept their stock. The pipe was not open to the view, and there was no evidence of any previous patent defect. The jury found that the pipes were reasonably fit and proper for the purpose for which they were to be used, and that the defendant had not been guilty of any want of care in keeping the pipe as it was. Upon these findings the learned Judge entered the verdict for the defendant as to so much of the claim as alleged as cause of action arising from the alleged negligence of the defendant in these respects; but the plaintiffs also claimed in respect of the defendant's covenant for quiet enjoyment. On that point the Judge had taken time for consideration, and now

The Judge gave judgment finally for the defendant, adhering to his opinion on the first ground of action, and giving his opinion on the other point as follows:—The flow of water into the plaintiff's warehouse to the extent proved was such an interference with the plaintiff's possession as to have amounted to an interruption within the meaning of the covenant, and if the interruption had been caused by any wilful act of the defendant, or had been the probable consequence of any act done by him after the demise, I should have held that there was a breach of the covenant. But in the present case the water, though in a sense brought into the cistern by the defendant, he being the person who contracted with the company for the supply, yet was brought for the necessary enjoyment of the plaintiffs and at their request, and therefore was an act contemplated before and necessary to their enjoyment of the premises, and not an interruption of it; and the only wilful act of the defendant was the fixing of the pipes by which the water was distributed, and this was done before the demise, and was an act in contemplation, and not in interruption of the enjoyment. It is unnecessary to say whether, if the defendant had carelessly fixed insufficient pipes or failed to keep them in good repair, such acts would have amounted to a breach of the covenant; for the jury have found that he was guilty of no such negligence. No doubt the plaintiffs have sustained serious loss, from no fault of theirs; but unless I can see my way, in accordance with law, to throw the loss upon the defendant, the burden must fall where the law leaves it, and it is another added to that class of cases in which losses happen for which there is no legal redress.

Judgment for the defendant.

TESTIMONIALS AND LOCAL BODIES.

SIR,—Allow me, through your columns, to draw attention to the senseless practice followed by some corporations and other local bodies in stipulating that original testimonials must accompany applications for appointments. I have twice been applied to within the past month for reproductions of testimonials granted to assistants, owing to the originals being in the hands of Boards, to whom they had been sent in consequence of this condition, and kept so long as to be unavailable for other applications. Surely copies of testimonials should suffice in the first instance, and the originals could still be inspected, if thought desirable, at the personal interview with selected candidates which usually precedes the definite appointment. Besides the trouble caused to former employers by this practice, there is an obvious objection to parting, even temporarily, with testimonials, arising from the risk of accidental loss of documents which, as in the case of a deceased employer, cannot be made good. I know of no valid reason for the practice complained of.

C. E.

FARM PLANS AT THE KILBURN SHOW.

SIR,—Will you allow me space to say that I fully endorse the action of the Society in not awarding any prize to any of the plans of farm buildings? It should be borne in mind by competitors that this is an affair different from nearly all other competitions they may have been engaged in. A design for, say a church, town-hall, school, or mansion, is examined by a committee or by a professional referee, and award given accordingly, but the examination given is of quite a different character to that which should be, and no doubt was given to the above farm-plans, for in the former case the elevation is of much greater relative importance, and in the planning, if a room is not put in the best place, or of not the most suitable size, or the main dimensions of the building not exactly as they should be, the evil of it is not brought so clearly before those who have to use the buildings, as is the case in a set of farm-buildings. In this case, matters that are not considered by many competitors of much importance, say size of stable doors, height of mangers, aspect of wagon hovel, details of drains (in the latter item several of the plans showed gross want of thought), positions of supporting columns, &c., are, if not properly done, a daily source of annoyance, and in many cases of serious pecuniary loss to the farmer. Whereas, failings in details of a town-hall, mansion, &c., are not brought so vividly before the users of these buildings, and if they were, could be in most cases very much modified by them. And when we ascend from details to principles, the difference is still great, but as the discussion of this would require more space to deal with it than you could probably spare, I will merely say, in conclusion, that this competition is more akin to that, for, say a builder's complete establishment, ironworks, or, in short, for any manufactory where economy of time and money in the working of it is a *sine qud non*, and until a competitor can put himself mentally in the position of a manufacturer who is wanting the best plan for his factory, totally regardless of precedent or of any consideration beyond the best and cheapest way to manufacture his goods, he will never be likely to succeed as a planner of farm buildings.

It may be news to many to be told that the planning of farm buildings is a mine but very little worked.

SALT.

SIR,—The Farm Buildings Competition of the Royal Agricultural Society has proved another striking instance of competitions, and tends to show how little chance competitors have of obtaining any remuneration for the time and money spent in perfecting their plans. The very meagre report issued by the judges in speaking of the plans says:—"That although as a whole they display much architectural power and, in many instances, considerable practical knowledge of farming requirements, there are none that combine superior arrangement of detail with that economy of cost which is so essential." As the competition was ostensibly arranged to provide a set of plans in each class which should be considered models, it certainly seems strange that from amongst sixty-nine competitors, including members of the Institute, the judges could not select one or two worthy of a prize, even though the cost might be greater than they considered necessary, and in their report suggest any alteration which would tend, in their opinion, to reduce the expense and improve the arrangement; for, as matters now stand, there is no immediate prospect of obtaining from the Royal Agricultural Society their idea of a model set of farm buildings. I would suggest that the 200*l.* be offered to the judges for what they consider a suitable arrangement in each class, to prevent competitors being again asked to spend their time and money for nought.

ARCHITECTUS.

POSTS IN THE GROUND.

SIR,—With reference to my namesake's letter on the generally inappreciated larch, it cannot be too generally known that larch posts let into ground should always be inverted. Few with a shadow of experience are ignorant of the fact that "between wind and water" does the first symptom of decay appear. The why and wherefore is palpable. Nature so arranges the pores of the wood that moisture from the soil is, by capillary attraction, carried up to the branches. Some quarter of a century since, having read something of it, I let two into the ground, small end downward, that small end being about 8 in. diameter; two posts, the butt-end of each having roots left on, with arrangement for growing flowers. About 18 in. of each was embedded in the clay soil, which, with some 12 in. of mould at the surface, made the 2 ft. 6 in. below ground.

Some years after alterations enforced removal, when, to my surprise, I found that neither saw nor hatchet could act in preparing the semi-putrescent logs for firing. Let me say that the changed nature extended only to the surface of the soil. I do not for a moment doubt that other wood than larch would be equally hardened by similar treatment.

In the ordinary mode of "biggest end downward" evaporation of moisture from the wood goes on at the surface of the soil,—hence decay.

C. A. WHEELER.

PEKIN, IN CHINA.

A CORRESPONDENT of the *Hong Kong Daily Press*, who has recently paid a visit to the Chinese capital, says:—

There are perhaps few cities in the world laid out upon a finer plan than the northern capital of China. The streets are in many instances as wide as Regent-street, and cut each other generally at right angles. They are lined with shops, a large number of which are extremely handsome, their entire façades being richly carved and gilded from top to bottom. Instead of the hanging boards which in other Chinese cities announce to the passer-by the nature of the goods retailed, the shops here have tall upright posts, sometimes rising from the roof, sometimes standing on the ground, overlaid with gilding and bright colours. Other varieties of decorative art abound on all sides, some of the shops being painted to represent a most elaborate mosaic, the design and execution being rich and beautiful in the extreme. Everybody has seen an ornamental screen or centre table, inlaid with exquisite patterns and every shade of tint. Imagine this workmanship transferred in all its wealth and splendour to the front of an ordinary shop, where in Europe there would be nothing but stone or brick, and you will have some idea of the decorations which attract the eye and gratify the taste in the crowded thoroughfares of this strange town. The paths are sunk in some places 2 ft. or 3 ft. below the level of the roads, along which pass in an almost unbroken stream strings of camels, mules, and carts. In the latter vehicles are frequently to be seen brilliantly tricked-out ladies with their cheeks and eyes bedaubed with coarse Magenta paint; mandarins,—only the very highest of whom are permitted the privilege of sedans,—and occasionally a living Buddha, in the form of some Lama priest of rank, dressed from head to foot in gleaming yellow silk. Now, to judge from the above description, one might easily conclude that Pekin was a very wonderful and gorgeous place. But this would be a very great mistake. Hitherto we have only looked at one side of the glowing Oriental scene. Side by side with the flaunting golden shops are squalid, filthy houses, rotting slowly and uncared for. Heaps of filth stand seething here and there; the thoroughfares, broad and straight as they are, which we have spoken of hitherto for convenience sake as streets, are a mere irregular collection of bogs and ditches, along which we walk now through piles of dust, now beside stagnant puddles, noisome, putrid, and green. In dry weather Pekin is a gigantic dust-bin; during the rains it is a whirling cesspool. The foreign-built houses in Pekin are, I believe, confined exclusively to the enormous compound occupied by the British legation.

MASTERS AND MEN.

Forest of Dean Ironworkers.—Notices have been given by Messrs. Crawshay, ironmasters, Forest of Dean, by which a number of their men will be discharged at the expiration of contracts. Notice has also been given to the remainder of their furnacemen of a 5 per cent. drop, with the alternative of suspending operations.

Sheffield.—The dispute in the Sheffield building trade is now practically at an end. On the 17th inst. a meeting of carpenters and joiners was held to receive the report of the delegates who had been making a canvas of the employers to get their signatures to the old working rules. The delegates reported that they had received the signature of nearly every employer they had solicited, amongst them being the principal firms in the town. A resolution was adopted closing the strike from that night, allowing the men to go to work at all shops where their rules and rate of wages had been agreed to.

Chainmakers' Wages.—The chain and trace makers of Cradley Heath district have served the following notice on their employers:—"The chain and trace makers beg respectfully to inform you that they will require the 4s. list price for any work they may make after the 2nd of August next." Things have been bad for a long while in the chain trade, and it is stated that there are at present hundreds of the workpeople striving hard for the pittance of 6s. per week.

Bristol.—It is reported that the master builders of Bristol are now obtaining the services of London masons used to the working of Bath stone, to take the place of the men on strike, some masons introduced from the North not being accustomed to this class of work. The stonemasons offered to submit their rules to further consideration if the employers would not enforce the reduction of a halfpenny per hour in their wages, but allow them to resume work at the old rate of payment. The masters replied that the only basis on which they would negotiate with the workmen would be that in the outset they should accept the reduction. If they admitted the necessity of the reduction, the employers would then be prepared to make arrangements for an interview with the representatives of the workmen. The men, however, refused to submit to the reduction. The strike has now lasted more than two months.

PROVINCIAL NEWS.

Ryde (I.W.).—A meeting of the Ryde Town Council was held on the 15th inst., to consider the tenders for the extension of the Esplanade, and the construction of the new promenade off Apley. There were eight tenders for the work, that of Messrs. Perry & Co., Tredegar Works, Bow, being the highest—21,475*l.* The lowest was that of Messrs. Meats, Bros., of Nottingham, whose tender was 9,000*l.* The surveyor, and several practical members of the council, said that this must be a mistake, as, after carefully going through the quantities, they did not see how the work could possibly be carried out for less than 12,000*l.* or 13,000*l.* The Special Improvement Committee, under these circumstances, recommended the council to accept the next lowest tender, that of Messrs. Hill & Co., of Stokes Bay Works, Gosport, whose tender was 12,975*l.* This firm constructed the forts at Spithead, and have carried out a number of Government contracts. Mr. Futcher moved as an amendment that the lowest tender be accepted. Councillor Ellery, in supporting the amendment, spoke of the wide differences in contractors' tenders as they appeared in the *Builder*. The amendment was lost by 6 to 4, and Messrs. Hill's tender was accepted. Upwards of nine acres of the shore will be inclosed, and the carriage-drive of the Esplanade will be continued out to Apley Point. It will then wind round a miniature lake of the sea-water, back to the present Esplanade.

York.—New business premises on Foss Bridge, York, for Messrs. Whitehead & Co., are now approaching completion. The building is built of brick, in the Italian style, boldly treated with stone dressings. The building has been designed by Mr. J. Morley, architect, Bradford, and the work has been carried out under the superintendence of Mr. J. Maude. The following are the contractors for the different works:—Messrs. Walker, Brothers, bricklayers, with Mr. Bailey as stonemason and Mr. W. Hessey as carver; Mr. Dennison, joiner; Mr. Bousfield, ironwork; Mr. Ward, plasterer; and Messrs. G. & H. Scaife, painters, all of York; and Mr. Ryder, plumber, Bradford.

FROM SCOTLAND.

Galashiels.—On the 17th inst. the Galashiels Town Council met to consider what steps should be taken in the matter of the pollution of the Tweed. It was agreed that a survey be made of the town, preparatory to getting competitive plans for a drainage scheme.

Glasgow.—The new floating baths, designed by Mr. James M'Cunn, and intended to be moored off Fort Matilda, Greenock, were launched at Port Glasgow on the 18th inst.

Burntisland.—At a meeting of the Burntisland Town Council on the 18th inst., a report by Messrs. J. & A. Leslie, civil engineers, was submitted as to the effect of depositing ballast on the west foreshore, and the means to be adopted for preventing its being washed away by the tide. For the retention of the ballast in future, Messrs. Leslie recommend the erection of a breakwater, 1,450 ft. along the line of low-water mark, which is the town's boundary, enclosing an area of 13¼ acres, and which might cost 8,750*l.*

STAINED GLASS.

Headingley (Leeds).—The east window in St. Michael's Church has been filled with stained glass, illustrative of some of the principal events in the Passion of our Lord. The subjects chosen for the four chief openings are as follow:—"Christ bearing the Cross," the "Crucifixion," the "Resurrection," and "Christ meeting Mary after the Resurrection," the "Ascension," as the culminating event, being reserved for the three larger tracery lights. The work is executed in the style of the fifteenth century, and has been designed and painted by Powell, Bros., under the superintendence of Mr. C. Fowler, architect, Leeds.

Coggeshall.—A new stained-glass window has just been placed in the north aisle of St. Peter's Church, at the back of the choir-stall, by Major G. D. Skingley, in memory of his late wife. The window is divided into three lights, and the subject illustrated is the "Sermon on the Mount," the text being "Blessed are the pure in heart, for they shall see God."

Rhyl.—Two stained-glass windows have been completed and placed, one in St. Thomas's and the other in Holy Trinity churches, in memory of the late Ven. Archdeacon Morgan. The one window contains twelve Scriptural representations, three in each light. The upper portion of the other illustrates an angelic choir, and the five lower divisions Scripture subjects, such as "The Good Shepherd." The windows are by Messrs. Ward & Hughes.

Peterborough.—The clergymen who have been admitted to holy orders by the Bishop of Peterborough during the ten years of his episcopate have placed a stained-glass window in the private chapel of the Bishop's Palace. The window, which is in two lights, is illustrative of Psalm cxxvi. 6,—"He that goeth forth and weepeth, bearing precious seed, shall doubtless come again with rejoicing, bringing his sheaves with him." The window is the work of the well-known firm of Lavers, Barraud, & Westlake, London.

At Messrs. Harvey & Davids' Sale, at the Mart, last week, amongst the various properties sold was a freehold and leasehold estate, situate in Artillery-passage and Frying-pan-alley, Spitalfields, for which there was a spirited competition, in spite of the uncertainty as to the exact boundary of the freehold and leasehold portions, which Mr. Davids, the auctioneer, very properly pointed out. The total amount realised, 6,682*l.*, showed that properties divided into small lots are fetching good prices at the present moment.

CHURCH-BUILDING NEWS.

Pickering.—St. Peter's church, Pickering, Yorkshire, has been restored and re-opened. Consisting of spacious nave, north and south aisles, transepts to north and south chancel, and tower with spire, the church's dilapidation had become so serious that it was dangerous to the congregation. Attention was first given to the Norman tower, the architect (Mr. J. S. Crowther, of Manchester) pronouncing it in a very unsafe condition. The foundations were taken out, and the greater part of the structure rebuilt. Then the foundations of the north wall and chancel were made good. The north transept was found to be so decayed that nothing short of rebuilding would serve, and this also was done. The chancel, which was in an almost equally bad state, has been restored at the cost of the Ecclesiastical Commissioners, the work including a new open roof of Riga oak. From the west end the old gallery and vestry have been removed. The high-backed pews have been replaced by open stalls of oak. With the exception of the old stained-glass east window, which it was not necessary to disturb, and whose five lights are filled with figures of our Saviour and the four Evangelists, the windows were of a very plain description. Several new stained-glass windows have been erected in the church. The two transept windows, by Clayton & Bell, have been erected by James and Thomas Mitchelson, in memory of their father and mother. A window in the centre of the north aisle (by Shrigley & Hunt, of Lancaster), in memory of Eliza Cole, is illustrative of the parable of the Good Samaritan.

Tresco.—The new church of St. Nicholas at Tresco, Scilly, has just been opened. The dimensions of the building are 81 ft. by 22 ft. in length, width at the transept 48 ft. by 24 ft., and the seating accommodation is for 250 persons. The church is cruciform in shape, and is surmounted by a small square tower, which stands on the south-east side. The roof is vaulted, and of pitch pine, and the whole of it, as indeed the entire main fabric of the church, has been executed by workmen on the Tresco Estate. The east window, which consists of three lights, was designed and executed by Mr. Kempe, of London. Beneath the window has been erected a reredos, the gift of Colonel Smith-Dorrien. It is made of Cornish marble, and is the workmanship of Mr. Bradbury, of Penzance. The pulpit is the gift of Mrs. Smith-Dorrien, and is of carved woodwork, with a stone pedestal. The font is of Cornish marble, supported by small granite columns. Mr. Dorrien-Smith has given valuable assistance in the building of the church; and, indeed, the original design was prepared by him.

Stowe.—The church of St. John the Baptist, Stowe, has been re-opened, after restoration. The work now done has opened out the tower to the nave, the western gallery being removed, an arcade with new aisle being formed on the south side. The arcade consists of three arches. The plaster ceiling has been removed, and the present timbers, though of a rough character, have been exposed to view, and carved bosses, corbels, and pendants added, whilst the whole underside has been boarded upon the rafters. A vestry or sacristy, with heating-chamber underneath, has been added on the north-east side, divided from the aisle by a wooden screen, the whole being warmed by hot-water apparatus. The church has been reseated throughout. All is plain deal, unstained and varnished. The pulpit, reading-desk, and font have been restored and refitted. The accommodation in the church as now completed is greater than when the old galleries existed. The stone-work has been dressed and pointed inside, but outside the old stones have been used without dressing off or disturbing the old gray coating. The architects under whose direction the work has been designed and carried out, as also that previously done in the chancel, are Messrs. W. G. Habershon & Fawckner, London; the builder being Mr. Whittingham, Newport, Salop.

Llanbadarn Fawr (Wales).—On the 1st inst., Mr. Seddon inspected the works done to the tower and north and south transepts of this church, and reported that the whole had been executed in a workmanlike manner, to his satisfaction. It was resolved that the contract for the seats under the tower be let to Messrs. Roderick Williams & Son, for 170*l.* Also, it was agreed that a chamber, 10 ft. deep, be excavated at the north-east corner of the tower, and a drain therefrom to the road. Fittings are still required. The lovers of ecclesiastical antiquity are requested to lend a helping hand to complete this undertaking, by sending contributions.

Halifax.—The restoration of Halifax parish church is approaching completion, and the 7th of October is definitely fixed for the opening.

Bristol.—The church of St. Werburgh, which formerly stood at the top of Small-street, and which was pulled down to be re-erected in Mina-road, Baptist-mills, will be completed in about two months. The length of the new church is 79 ft., being 19 ft. longer than the old one, but the breadth is the same, namely, 59 ft. It consists of a nave, north and south aisles, chancel, organ-chamber on the south side of the chancel, vestry on the north side, western porch, and tower. The only difference in the plans of the old and new churches is that the latter has a chancel which the old one had not, and that there is an alteration in the position of the turret, which was originally on the north-west angle of the tower, but it is now placed on the south-west angle. The chancel is 20 ft. wide and 25 ft. long. The roof is of pitch-pine. The main ribs are supported by the figures of angels carved in wood. The nave will be seated with pitch-pine open benches to accommodate 650 worshippers, which is greatly in excess of the old building. The windows of the nave are five-light windows cusped, of two designs alternating. The exterior of the building is of free-stone; the roof is covered with Broseley tiles. The whole of the monuments from the old church are being re-erected.

Aston.—Aston Church, Birmingham, is now in course of enlargement and restoration. The church at present provides accommodation for nearly 500 people. The enlargement will provide 800 additional seats. This will be done by extending the nave and aisles in an eastward direction to about the end of the present chancel, and the addition of the present vestry under the tower. The roof and clear-story windows will be raised to a suitable height, a new chancel will be erected, with an organ-chamber on the north side, and the present chancel re-erected, together with the monuments it now contains in their present relative positions on the south side; and a new vestry will be built. The cost of the work is estimated at between 8,000*l.* and 10,000*l.* The first section of the work, which is now in progress, consists of the extension of the nave and aisles, and is estimated to cost 4,000*l.* The work is being done by Mr. Davies, of Watery-lane.

Hampton Wick.—The alterations to St. John's Church, Hampton Wick, are now completed. A pulpit has been erected, to correspond with the new seats, which are of pitch-pine. The whole of the work has been executed by Mr. John Hurst, contractor, Teddington, from the designs of Mr. R. T. Elsam, architect, Hampton Wick.

Winderton.—The new church which has been erected in the village of Winderton, in the parish of Brailes, has been consecrated by the Bishop of Worcester. The architect is Mr. William Smith, of London, and the builder was Mr. Attwood, of Brailes.

DISSENTING CHURCH-BUILDING NEWS.

Kirkcaldy.—A new "Original Secession" church has recently been opened at Kirkcaldy. The church is situated on rising ground in St. Clair-street, is built in the Gothic style of architecture, and is seated to accommodate 200 persons. The total cost is estimated at 850*l.* The sole contractors for the work were Messrs. Fraser & Son, builders, Pathhead.

Willington Quay.—The foundation-stones of a new Wesleyan chapel were laid, on the 16th inst., at Rosehill, Willington Quay. The new building will be of brick, with stone dressings. The length inside will be 44 ft. and the breadth 31 ft. There will be a school-room underneath the chapel, and each will be capable of accommodating about 300 persons. Mr. James Grant, of St. Anthony's, is the contractor and builder, and the undertaking will be superintended by Mr. R. Davidson, trustee's secretary, as clerk of the works. The total cost will be 800*l.*

Askern.—The new Wesleyan chapel at Askern has been opened. The contract for the erection of the chapel was let to Mr. John Parry, of Castleford. The chapel is in the Early English style, and is calculated to seat 400 hearers. Behind the chapel are a vestry, two class-rooms, and a school-room capable of accommodating 100 children. The heating apparatus has been supplied by Messrs. Truswell and Holden, of Sheffield. The cost of the erection and fittings (exclusive of the site) will be about 1,600*l.*

Books.

The Law and Practice as to Particulars and Conditions of Sale, with Notes and Forms. By R. H. COLE. London, 1879.

THE title of this little work is misleading, for it is in reality nothing more than a small handbook, less than 100 pages in extent, of conditions of sale. If it were what its name purports we should not mention it here, but being, as we say, no more than a handbook, it will be of use to a good many of our readers who may wish to know something of the subject of which it treats. Any one who has a difficult question in connexion with sales of land or houses will probably ultimately save money by consulting his lawyer; but, on the other hand, the man who only requires to find out some point of no great difficulty or importance will most likely save six and eightpence if he possesses this handbook.

The Abbey Church of Melrose, Scotland. Illustrated by FREDK. PINCHES, Architect, A.I.B.A. Shaw & Son, Fetter-lane, London.

IN the year 1878 Mr. Pinches spent upwards of three months at Melrose making measured drawings of the remains, most of which were submitted in competition for the Silver Medal of the Royal Institute of British Architects, and were successful in obtaining it. While engaged on the work, it was suggested to him by numerous visitors to the Abbey, that, as there were no measured drawings extant, it would be very desirable for him to publish his. This he has done, believing that measured drawings of this interesting ruin would be acceptable to many who would otherwise be unable to enjoy a careful study of the building. The work consists of ten large photo-lithographic plates, comprising general drawings of the Abbey Church, numerous details and perspective sketches, with twenty pages of historical and architectural descriptive text. It makes a handsome volume, and shows that Mr. Pinches possesses considerable skill in draughtsmanship. The remains range in date between the years 1322 and 1510. Thanks to Sir Walter Scott, the ruins of Melrose Abbey Church have been heard of wherever the English language is spoken, and elsewhere besides.

Cottages: How to Arrange and Build Them to insure Comfort, Economy, and Health; with Hints on Fittings and Furniture. By a Sanitary Reformer. London: Bemrose & Sons.

THIS, which is designed to be a popular book of information and suggestion on the subject of which it treats, would have been more directly useful and more likely to be read if the advice and information contained in it had been given in a more condensed form, and less spun out with reflections and quotations which are sometimes hardly to the point and add nothing to the value of the book in any way. A book on a practical subject such as this can hardly be too condensed and too plain and matter-of-fact in style. Apart from this objection, which would be of little comparative consequence except that it must diminish the usefulness of the book to some extent, there seems to be a good deal of information contained in it in regard to the more obvious requisites of health and convenience, and making the most of space and material, in cottages and small houses; and a number of plans are given for suggestion and comparison. There are also some hints as to inexpensive methods of making cottage rooms a little ornamental and interesting, as they may very well be made at little cost of money, though not without some expenditure of trouble and consideration. It would have been better to have omitted the elevations to the cottages,—they are not good. It is impossible economically to make buildings of this class ornamental or artistic; it must be sufficient to make them neat and suitable looking. The barge-boards and other excrescences added by way of cheap ornament only make such buildings look flimsy and pretentious.

VARIORUM.

THE attention of all those of our readers who take interest in survey, and more especially in hydrographic survey, will be awakened by the review of Herr Brugsch's "Egypt," in the present number of the *Edinburgh Review*. We referred to the great interest of the work, in an architectural point of view, at the time of its publication; and the last number of the *Quarterly* contained a review highly laudatory of the volumes. The present number of the blue and buff, however, turns the reverse of the medal; and, while rendering no stinted praise to the picturesque portions of the work, joins issue most stoutly as to Herr Brugsch's geographical views. The Reviewer has consulted and compared a series of maps of Northern Egypt, the first of which is attached to the geography of Ptolemy,—a work written in the second century of our era; while the last is a chart published by the English Admiralty in 1858. These maps show a steady growth of the delta to the north, the difference between the position of the coast-line in Ptolemy's map and in that of Admiral Spratt being no less than forty-one miles. At this rate of increase it becomes evident that the statements of Herodotus as to the accessibility of Memphis from the sea in his time are probably exact. The issue joined between the Reviewer and Herr Brugsch is simply whether the latter, in taking the great French survey of 1807 as the basis of the map published with his book, has not represented a state of things which was merely a transient phase in the constant transformations of the delta which occurred at the commencement of the present century, as existing at the time of the exodus. The subject cannot fail to excite discussion, and it is one as to which we do not see that any difference of opinion can be ultimately admissible. When we find the German author, referring to a narrow cordon of sand shown on his map, saying,—"It was on this narrow tongue of land, bounded on the one side by the Mediterranean Sea, on the other by the lagoons of weeds, between the entrance to the Khirot, or the gulf, on the east, and the Sanctuary of Baal Zephon on the west, that the great catastrophe took place"; while the Reviewer says that the position thus indicated "must have been at the bottom of the Mediterranean, and from eighty to a hundred miles north of the coast of the delta, at the time of the exodus," it is clear that the question is not one of literary criticism, but of hydrographic action, and of the authenticity of maps.——*House and Home*, a penny journal referring to sanitary house construction, overcrowding, domestic economy, and so on, is likely to do useful service by carrying information on these points down to lower and wider strata of the social pyramid than have been yet approached.——*Fraser*, under Principal Tulloch, starts afresh this month, opening with a pleasant sketch of what it has done and what it will hope to do. It includes the first portion of a story, "Mary Anerley," which promises well.——We understand that Mr. Richard Anderson, F.C.S., whose paper on Lightning Conductors attracted attention last year at the meeting of the British Association, has nearly ready for publication an extended treatise, which will discuss, both historically and practically, the whole subject of protection from lightning.——It is proposed to publish by subscription "Selections from the Records of the City of Oxford, with Extracts from other Documents illustrating the Municipal History: from Henry VIII. to Elizabeth [1509—1603]." The work will be edited, by authority of the Corporation of the City of Oxford, by Mr. Wm. H. Turner, of the Bodleian Library; under the direction of Mr. Robert S. Hawkins, town clerk. The chief interest of these records lies in the full and vivid pictures which they give of the struggles between the city and the university. The dissensions arising from the charter of Henry VIII. obtained by Cardinal Wolsey for increasing the power of the university, and its ultimate rejection; the contest of the citizens in maintaining their Court Leet, and the final reference of all matters in dispute to the Privy Council, with the orders thereon; the discommoning and excommunicating of the mayors and bailiffs by the university, and the proceedings of the former in endeavouring to assert their privileges, are all duly and fully recorded. ——The *Sanitary Record* says,—"Attention has lately been called to the want of proper ventilation in the underground tunnels of the Metropolitan Railway, and it is suggested that a very salutary lesson might be derived by the directors, after an inspection of the Liverpool Lime-street tunnel, of the Mont Cenis Railway tunnel, or of any second-rate colliery. One gentleman, by way of illustration, gives his experience while lately travelling between Edgware-road and King's-cross stations. He describes the condition of the atmosphere to have been so poisonous that, although a mining engineer, he was almost suffocated; was obliged to be assisted out of the train at an intermediate station, taken to a chemist's shop close by, and be supplied with some restorative. The chemist admitted that he had often twenty similar applications in a day." We have ourselves called attention to this matter more than once. Something should most certainly be done to cure this much-complained-of evil.——The *American Bookseller*, for June, includes a valuable Index (monthly) to Current Periodical Literature, Proceedings of Societies, and Government Publications, for which we are glad to see good use has been made of our own pages.

Miscellanea.

The Chair of Fine Art, Edinburgh.—Although the deed of foundation for the Watson-Gordon Chair has not yet been formally communicated to the Senatus Academicus, arrangements are being made for having the Professorship brought into operation without unnecessary delay. The bequest, which amounts to a little over 11,000*l.*, cannot, however be fully realised for six months to come, so that the proposed class cannot be opened before the session of 1880. The conditions which the testator, the late Mr. H. G. Watson has attached to the foundation, provide, the *Scotsman* believes) that the appointment of the professor shall be vested in the University Court, together with the president of the Royal Scottish Academy, and that a course of instruction shall be given in the history and theory of the Fine Arts and other topics connected with the subject. Of the 11,000*l.* bequeathed, 1,000*l.* will be retained by the University Court for application in connexion with the Chair; and the revenue accruing from the remainder of the endowment, which is expected to be between 400*l.* and 500*l.* a-year, will form the salary of the Professor, in addition, of course, to his class fees. As to the students, all that is stipulated is that prize-takers at the Life School, not exceeding six in number, shall be entitled to attend the classes without payment of fees. The professorship will, in all probability, be offered to one of the Scotch Academicians.

Dr. Schliemann, writing from Troy (Asia Minor) to a friend in Indianapolis, says, "I think that there is no lady in the world who could have made me so happy as Mrs. Sophia Schliemann, whom I married ten years ago from pure affection, and because, though she then only knew her native tongue, the modern Greek, she showed a great enthusiasm for Homer and archæology. Since that time she has perfectly mastered nearly all the European languages, learned nearly all the Homeric poems by heart, and constantly assists me with fervent zeal in all my undertakings; nay, the French edition of my Mycenæ is dedicated to her, and she fully deserves it. You say my work has not been profitable to me; but if, as you say, you read my Mycenæ, you ought to know that I work from pure love for science, and that I gave away to the Greek people the immense treasures found by me and my wife at Mycenæ. . . . . Believe me we have nearly all our money in America, and if we buy a home in Indianapolis, it is with the intention to remove thither sooner or later. We spend the value of palaces in our scientific explorations, but are content and happy in a modest little cottage."

A Sanitary Reformer's "Te Deum" ought now (says the *Hampshire Independent*) to be sung in Winchester. The twenty years' war against cesspools is brought to a close by an announcement from the Town Council that they are prepared to receive applications for connecting with the main drainage. It is a good illustration of the excellent adage, — "Perseverantia omnia vincit."

Tower (High Level) Bridge (Metropolis) Bill.—The Select Committee on this Bill renewed its sittings on Monday, when the Chairman (Lord H. Lennox) announced that, in the unanimous opinion of the Committee, the preamble of the Bill had not been proved. The Bill is therefore thrown out.

St. Mark's Church, Hamilton-terrace.—We are asked to say that the execution of the six mosaic panels in the pulpit should have been ascribed to the Venice and Murano Mosaic Company, instead of to Dr. Salviati.

The Electric Light still burns brightly on the Victoria Embankment, although extinguished on the Holborn Viaduct. At the meeting of the Metropolitan Board of Works on the 18th inst., the Works and General Purposes Committee reported on an offer by the French Electrical Society to supply twenty additional lights at a charge of 3d. per light per hour for the whole sixty lights, provided that the Board would give them a contract for twelve months from the expiration of their present contract; and recommended that a proposal be made to the Society to place eight or ten of such additional lights upon Waterloo Bridge; that the Vestry of St. Martin's-in-the-Fields be asked to co-operate with the Board with a view to the lighting being extended along Northumberland Avenue; and that, subject to the Board being enabled to make these arrangements, the offer of the French Society be accepted. Mr. Dresser Rogers, in moving the adoption of the report, said that in December, 1878, the Board commenced its experiment on the Embankment when twenty lights were provided at a cost of 6d. per light per hour. After awhile the charge was reduced to 5d. per light per hour. For nearly nine months the Embankment had been lighted by this means without any failure or hitch of any kind whatever. The number of lamps had been increased from twenty to forty, and so marked was the progress that had been achieved, that it was now found that they could maintain the light on one circuit having a radius of over two miles and a half. The company was now prepared to reduce its charge to 3d. per lamp per hour. The report was adopted.

Dock Extension at Great Grimsby.—The Union Dock, opened by the Prince of Wales on Tuesday, is the most recently-constructed of a series of docks constructed by the Manchester, Sheffield, and Lincolnshire Railway, and it connects the Old with the Royal Dock. The railway company have expended in the construction of docks at this port the large sum of 1,842,000*l*. The whole area covered by these various works is 71¼ acres, and there is, besides, another dock in course of construction with an area of 26 acres, while it is proposed to build a timber dock which will extend over a space of 19 acres. It is in contemplation, too, to reclaim from the Humber 203 acres more land for the purpose of further dock extension. The proceedings of the day included the unveiling of a statue of the late Prince Consort (who laid the foundation of the Royal Dock in 1749), given by Sir E. W. Watkin. The statue, which is of bronze and of heroic size, is a replica of that which was executed for the Queen by Mr. W. Theed, and which was erected at Coburg a few years after the Prince's death.

Death of Mr. Charles Landseer, R.A.—Mr. Charles Landseer, R.A., died on Tuesday evening at his residence in St. John's Wood, in his eighty-first year. He was the elder brother of Sir Edwin Landseer. He first exhibited at the Royal Academy in 1828, and he was a contributor to the present year's exhibition. He was elected an Associate in 1837, and eight years afterwards he became an Academician. When the Keepership of the Academy became vacant by the resignation of Mr. Jones in 1851, Mr. Charles Landseer obtained the appointment, which he continued to hold until his failing health compelled his resignation, about six years ago.

A New Exhibition.—An Exhibition and Market of Machinery, Implememts, Utensils, and Fittings used in brewing, malting, distilling, wine-pressing, and in the making or manufacture of aërated waters, cordials, syrups, cider, perry, cigars, tobaccos, pipes, &c., also fittings, implements, utensils, machinery, and other accessories necessary for the business of a licensed victualler, is to be held in the Agricultural Hall, London, commencing on Monday, the 29th of September.

The Ordnance Survey.—In the House of Commons, on Monday, Mr. Gerard Noel, First Commissioner of Works, replying to Mr. Rowley Hill, said:—"Satisfactory progress is being made with the Ordnance Survey of England and Wales on the 25-inch scale. Eighteen counties have been surveyed, rapid progress is being made with thirteen others, and six counties have been partially surveyed. With regard to the county of Worcester, I fear some little time must elapse before the survey of that county can be commenced."

Darenth Asylum.—The managers of the Metropolitan Asylums Board paid their first annual visit last week to a new work which they have commenced, in the endeavour to utilise a hitherto waste force, by the education and industrial training of pauper imbecile children. A temporary asylum was established under Sir E. H. Currie's committee, and there the pauper imbecile children drawn from workhouses and asylums were classified, taught, and trained, under Miss Stephens. The asylum at Darenth, built on the hill overlooking the valleys of the rivers Thames and Darenth, was completed last year from designs by Messrs. A. & C. Harston, and accommodates 700 children, and on Saturday 420 of them were seen. The visitors were taken over the asylum by Dr. Fletcher Beach, the medical officer, and by Mr. and Mrs. Gower, the administrative officers. While all were pleased with the general construction of the building, the system of open corridors,—insisted upon, it was stated, by the Local Government Board because an inspector had seen it in Berlin,—was generally regarded as altogether unsuitable to a building on a Kentish hill. The asylum is a working institution in all respects, and is independent of sewerage, water, and gas companies, for it utilises the sewage, makes its own gas, pumps its own water, and grows part of its own food.

Porcelain at Liverpool.—The prizes offered by Mr. P. H. Rathbone, late president of the Liverpool Art Club, for the best specimens of painting on porcelain, of which an exhibition will commence next week at the Club-room, have just been awarded. M. S. Arnoux, of Stoke-upon-Trent, was consulted as to the merits of the various specimens submitted, and he has awarded to Mr. W. J. Audsley, of Liverpool, the first prize for a specimen of large Venetian glass, numbered 4 in the catalogue; and the second to Mrs. Richard Williams, of Wrexham, for a pair of vases, marked No. 77 in the catalogue. No. 7 in the catalogue, a specimen of work from Miss Marian Gemmell, Ainsley-road, London, has been highly commended. There are altogether 174 works catalogued.

Brompton Hospital for Consumption.—The Prince of Wales last week laid the foundation-stone of a new building for the Hospital for Consumption and Diseases of the Chest, Brompton. The extra building is situated opposite the hospital of which it forms an extension, in the Fulham-road, and will contain accommodation for 137 beds. Mr. T. H. Wyatt is the architect, Messrs. Higgs & Hill, of South Lambeth, being the builders.

Tramways.—This last week Mr. John T. Simpson, contractor, of Newcastle-upon-Tyne, completed his contract with the Newcastle Corporation for the laying down of seven miles and a half of tramways in that town. The system adopted was Kincaid's, of London, and the engineer was Mr. A. M. Fowler, late borough engineer of Salford.

Compensation.—An American lady who is now travelling in Italy—happy creature!—writes to a friend, according to the *Parisian*, from Venice:—"The architecture is singular, but ices and sherbets cost next to nothing."

Art Exhibition in Munich.—The International Art Exhibition in Munich was opened on the 19th inst., by Prince Luitpold, who was commissioned by King Louis to preside at the inauguration.

TENDERS

For alterations and additions to the Duke of Edinburgh, Queen's-road, Bayswater. Messrs. Bird & Walters, architects:—

Nightingale	£2,415 0 0
Williams & Son	2,380 0 0
Godden	2,320 0 0
Hockley	2,090 0 0
Anley	1,997 0 0
Brown & Son	1,948 0 0
Mark	1,930 0 0

For alterations and additions to the Queen public-house, Neate-street, Camberwell, for Messrs. Watney & Co. Mr. C. W. Bovis, architect:—

Hedgley	£1,140 0 0
Hockley	1,114 0 0
Anley	1,017 0 0
Taylor	967 0 0
Grimwood & Sons	936 0 0
Steele, Brothers	870 0 0

For alterations to the Prince of Wales, Kentish-town, for Mr. Dyson:—

Gould & Brand	£165 0 0
Somerville & Hill (accepted)	149 0 0

For the erection of a villa residence on Haverstock-hill, for Mr. B. Brooks. Mr. R. E. Tyler, architect:—

Somerville & Hill (accepted)	£900 0 0

For alterations and additions to the Carpenters' Arms, Princess-street, Edgware-road, for Mr. H. Gordon. Mr. J. O. Cocks, architect:—

Eaton	£930 0 0
Hockley	838 10 0
Reames	800 0 0
Slater	750 0 0
Ellis	733 0 0
Mark	670 0 0
Beech	665 0 0
Forster	605 0 0
Vaughan	580 0 0
Harris (accepted)	568 0 0

For the completion of schools, Drummond-street, Hampstead-road. Messrs. Tarring & Wilkinson, architects:—

		Extra for Lift.
Scrivener & White	£927 0 0	£40 10 0
Veitch & Close	893 0 0	50 0 0
Bywater, Brothers	867 0 0	45 0 0

For first portion of Art School, Kennington, for the City Committee of Technical Education. Messrs. Tarring & Wilkinson, architects:—

Bucknall (accepted)	£593 0 0

For the erection of a dwelling-house in Fisherton-street, Salisbury, for Mr. G. J. M. Main. Mr. Frederick Bath, architect. Quantities supplied:—

Dolman	£1,299 0 0
Hale & Sons	1,297 7 9
Adey	1,274 0 0
Tryhorn	1,159 0 0
Harris (accepted)	1,154 15 0

For alterations to residence at the Castle Brewery, Salisbury, for Messrs. Pern, Heath, & Waters. Mr. Frederick Bath, architect:—

Barber	£142 5 0
Young & Sons	130 0 0
Tryhorn (accepted)	88 10 0

For additions to the Birdcage, Melton Mowbray. Mr. R. W. Johnson, architect, Melton:—

Barnes	£600 0 0
Glover	560 0 0
Hensman	550 10 0
Hayes	502 10 0

For forming new streets at eastern end of Melton Mowbray. Mr. R. W. Johnson, architect:—

Brown	£816 16 6
Hensman	625 10 0
Shaw	515 0 0
Barnes	510 0 0

For additional stabling at Cold Overton Hall. Mr. R. W. Johnson, architect:—

Hayes	£600 0 0
Halliday	535 0 0

For farm-steading at Edmundthorpe. Mr. R. W. Johnson, architect:—

Cotton & Co.	£2,520 0 0
Halliday	2,288 0 0

For addition to premises at Toft, Lincolnshire. Mr. R. W. Johnson, architect:—

Thompson	£1,559 0 0
Halliday	1,270 0 0
Story & Son	997 0 0

For the erection of a Coffee Tavern and Working Men's Club, Crouch End, Hornsey. Mr. Edward J. Paine, architect. Quantities supplied:—

Harper	£1,676 0 0
Bamford	1,649 0 0
Holmes & Son	1,639 0 0
Ebbage	1,500 0 0
Axford	1,468 0 0
Beck (too late)	1,412 0 0
Mattock, Brothers	1,316 0 0
Kerry	1,315 0 0

For the erection of new beer, malt, and hop stores, for Messrs. Green & Clarkson, Burton-on-Trent. Messrs. Scamell & Colyer, architects. Quantities by Messrs. Curtis & Son:—

	Buildings.	Ironwork.
Lilley	£2,700 0 0	£421 0 0
Dakin	2,651 0 0	415 0 0
Low	2 046 0 0	376 0 0
Chamberlain	1,998 0 0	410 0 0
Maddocks (accepted)	1,973 0 0	
Wileman	1,935 0 0	
Handyside	——	403 0 0
Thornewill & Warham	—— (accepted)	339 10 0

For new Presbytery, for the Rev. Canon O'Sullivan, adjoining the Catholic Chapel, Solihull, Warwickshire. Messrs. Joseph A. Hansom & Son, architects:—

Deebank (accepted)	£1,617 0 0

For repairs, decoration, &c., to Roydon Hall, Kent, for Lady George Gordon Lennox. Mr. A. E. F. Spratt, architect:—

Punnett & Sons (accepted)	£732 0 0

For extension of schools, Harwood-road, Chelsea, for the School Board for London. Mr. E. R. Robson, architect. Quantities by Messrs. Northcroft, Son, & Neighbour:—

Manley	£4,852 0 0
Wood	4,715 0 0
Cox	4,570 0 0
Wall, Brothers	4,550 0 0
Shepherd	4,500 0 0
Ashby, Brothers	4,493 0 0
Lawrence	4,445 0 0
Bangs & Co.	4,430 0 0
Hobson	4,375 0 0
Higgs & Hill	4,344 0 0
Hook & Oldrey (accepted)	4,333 0 0

For building spinning-mills for Mr. J. Dawson, Manchester. Mr. Fredk. Kay, architect. Quantities by Mr. W. Hofmann Wood:—

Atkinson	£3,790 0 0
Johnson	3,750 0 0
Gill	3,748 10 0
Webster	3,745 0 0
Hall	3,730 0 0
Wilkinson & Co. (accepted)	3,705 18 0

For the erection of new Board School buildings, Buckingham. Mr. E. H. Lingen-Barker, architect:—

Hawkins	£2,500	0	0
Cooper	2,401	0	0
Coleman, Brothers	2,385	0	0
Balcombe	2,317	0	0
Holton	2,150	0	0
Malshall & Boyse	2,100	0	0
Munday	2,000	0	0
Tibbetts	1,999	0	0

For alterations, additions, and decorations at Westbourne-grove Chapel. Mr. M. M. Glover, architect:—

Woodward	£290	0	0
Staines & Son	274	0	0
Bowles	271	0	0
Dixon, Roberts, & Lawrence	251	1	7½
Hook & Oldrey	232	0	0
Parker	223	0	0
Temple & Foster	210	0	0

For the erection of new schools, Gloucester-grove, East Chelsea, for the School Board for London. Mr. E. R. Robson, architect. Quantities by Messrs. Northcroft, Son, & Neighbour:—

Hunt	£6,974	0	0
Boyce	6,953	0	0
Hobson	6,896	0	0
Higgs & Hill	6,894	0	0
Aichison & Walker	6,844	0	0
Hook & Oldrey	6,792	0	0
Kirk & Randall	6,775	0	0
Wall	6,599	0	0
Grover	6,484	0	0

For additions and alterations to Waterloo-street Schools, Chelsea Division, for the School Board for London. Mr. E. R. Robson, architect. Quantities by Mr. W. H. Barber:—

Rankin	£5,200	0	0
Higgs & Hill	5,194	0	0
Scrivener & Co.	5,111	0	0
Thompson	4,929	0	0
Hobson	4,901	0	0
Jerrard	4,864	0	0
Tongue	4,846	0	0
Williams, Son, & Wallington	4,844	0	0
Hook & Oldrey	4,761	0	0
Tyerman	4,693	0	0

For alterations and additions to Holmwood House, Haverstock-hill. Mr. William Murray, architect:—

White	£1,035	0	0
Wall, Brothers	1,025	0	0
Hook & Oldrey	950	0	0
Julian & Co.	930	0	0
Revised Estimates.			
Hook & Oldrey	882	0	0
Julian & Co.	845	0	0

For new shop and dwelling-house, St. Martin's-street, Leicester-square, for Messrs. Fladgate, Smith, & Fladgate. Messrs. Quilter & Hardcastle, architects:—

Wall	£1,990	0	0
Hook & Oldrey	1,949	0	0
Turrell	1,935	0	0
Brass	1,793	0	0
Nightingale	1,752	0	0
Battley	1,695	0	0

For painting, &c., Nightingale-street Schools, for the School Board for London. Mr. E. R. Robson, architect. Quantities not supplied:—

Mark	£350	0	0
Petchy	319	0	4
Wall, Brothers	310	0	0
Grover	298	0	0
Hook & Oldrey (accepted)	293	0	0

For the making of a filter bed, the construction of a small covered reservoir, a quantity of pipe-laying, 100 yards of tunnelling 6 ft. square, &c., for the Pemberton Local Board, near Wigan. Mr. George Heaton, engineer:—

Gaskell	£2,013	5	4
Eckersley & Jones	1,964	5	6
Middlehurst	1,757	0	0
Noel	1,660	0	0
Winnard	1,539	10	11
M'Guire	1,509	19	2
Fotherley & Sons	1,483	19	5
King	1,465	10	5
Braddock & Matthews	1,461	3	3
Johnson	1,442	5	3
Taylor & Duckworth	1,266	6	7
Cunliffe (accepted)	1,060	0	0

For outfall sewer for the manor of Aston Local Board. Mr. Wm. Humber, engineer:—

Young & Co.	£13,801	13	10
Palmer	13,205	16	5
Hilton	13,118	17	5½
Bell	13,113	11	5
Nelson & Co. (accepted)	12,639	0	0

For new pavilion and other works at Stockwell Fever Hospital. Messrs. T. H. & M. T. Wyatt, architects. Quantities by Messrs. George Lansdown & Harris:—

Tibbett & Adams	£7,990	0	0
Chappell	7,933	0	0
Jones & Co.	7,750	0	0
Howard & Dorrell	7,480	0	0
Higgs & Hill	7,380	0	0
Nightingale	7,083	0	0
Tongue	6,648	0	0
Sawyer	6,499	0	0
Warren	4,775	0	0

For building three cottages in Warwick-street, Vauxhall, for Mr. John Jeffree:—

Whitby (accepted)	£770	0	0

For building two semi-detached cottages at Send Heath, Woking, Surrey, for Mr. W. Sedgley:—

Whitby (accepted)	£260	0	0

For completing premises, No. 8, Harrington-gardens, Gloucester-road, South Kensington, for the London Mortgage] Company (Limited). Mr. W. Wimble, architect. Quantities by Mr. W. E. Stoner:—

Moreland & Nixon	£3,200	0	0
Conder	2,795	0	0
Scrivener & Co.	2,715	0	0
Braid	2,632	0	0
Wilson & Eaton	2,610	0	0
Lawrance	2,597	0	0
Faulkner	2,547	0	0
Nightingale	2,547	0	0
Ashby & Horner	2,546	0	0

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All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

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